Report

RFI Summary and Presumptive Remedy for Proposed Industrial Redevelopment Area

Delaware Valley Works
South Plant
Claymont, Delaware

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Chemtrade, LLC
February 26, 2016
Revision 2

CERTIFICATION STATEMENT
RFI SUMMARY AND PRESUMPTIVE REMEDY FOR PROPOSED INDUSTRIAL REDEVELOPMENT AREA
CHEMTRADE SOLUTIONS LLC
CLAYMONT, DELAWARE

I certify that the information contained in this report is true, accurate and complete.

As to those portions of the report for which I cannot personally verify their accuracy, I certify under penalty of law that this report and all attachments were prepared in accordance with procedures designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, or the immediate supervisor of such person or persons, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations.

Dan Dietz, Vice President

February 25, 2016
Date

TABLE OF CONTENTS

TABLES

FIGURES

APPENDICES

EXECUTIVE SUMMARY

The Delaware Valley Works is located along the Pennsylvania-Delaware border (Marcus Hook, Pennsylvania and Claymont, Delaware). The Delaware Valley Works is comprised of a "North Plant" and a "South Plant". The North Plant on the north side of Philadelphia Pike (Route 13) is an active chemical manufacturing facility owned and operated by Honeywell International Inc. (Honeywell). The South Plant on the south side of Philadelphia Pike (Route 13) is a former chemical manufacturing facility currently owned and operated by Chemtrade Solutions LLC (Chemtrade). The Delaware Valley Works is the subject of an Initial Administrative Order (IAO) Docket No. RCRA-3-089CA, issued pursuant to the Resource Conservation and Recovery Act (RCRA) by the United States Environmental Protection Agency (USEPA) to General Chemical LLC, which previously owned and operated the South Plant. The effective date of the IAO is October 11, 2000. General Chemical was acquired by Chemtrade in 2014. Throughout the balance of this document, "Chemtrade" and "General Chemical" are used interchangeably. The properties that make up the Delaware Valley Works are distinguished by three USEPA ID numbers: 1) PAD981739758, the number for the North Plant; 2) PAD990823742, the number for the South Plant and a portion of the North Plant from 1986 to 2004; and 3) DED154576698, the number for the South Plant beginning in 2004. This report is specific to the South Plant, identified by USEPA ID No. DED154576698. In particular, this report addresses corrective measures for soils for the onshore portion of Parcel ID – 0607300002. The parcel is comprised of 27.48 acres, consisting of approximately 22 acres of land and approximately 5 riparian acres. The presumptive remedy described in this report is for the 22-acre onshore portion of the parcel.

Chemtrade and Honeywell have worked collaboratively to address environmental conditions associated with both the North Plant and the South Plant. Woodard & Curran, formerly Cummings/Riter Consultants, Inc. (Cummings/Riter), was retained by Chemtrade to provide assistance in addressing certain obligations under the IAO, which include technical activities under the RCRA Corrective Action Program. A number of investigations and environmental remediation activities (Interim Measures) have been undertaken at the Delaware Valley Works, and some of those activities are ongoing. Chemical manufacturing activities at the South Plant were discontinued in 2004, and the controlled demolition of buildings and structures at the South Plant is currently in progress and is expected to be completed by the beginning of the first quarter of 2016.

In early 2014, a team of developers approached Chemtrade regarding possible acquisition and redevelopment of the South Plant for a new industrial use as part of economic revitalization in the local area. The developers proposed building a new rail yard in a portion of the South Plant. Based on the findings of the RCRA Facility Investigation (RFI) completed under the IAO, this development approach has substantial environmental benefits. Chemtrade and the redevelopment team met with USEPA Region III and the Delaware Department of Natural Resources and Environmental Control (DNREC) on April 22, 2015 to discuss the possibility of integrating the site redevelopment with environmental remediation efforts on an expedited basis under the RCRA IAO. USEPA and DNREC were supportive of this approach, and provided a guidance document entitled "Resource Conservation and Recovery Act Facilities Investigation Remedy Selection Track, A Toolbox for Corrective Action" dated March 19, 2015. The guidance document focuses on tools within the RCRA Corrective Action Program advocated by USEPA to substantially shorten the time required to select remedies. The guidance document has been prepared under USEPA's RCRA First Initiative, and is herein referred to as the March 2015 RCRA Toolbox document.

This report summarizes the RFI work and USEPA's Environmental Indicators Determination (2011) completed for the South Plant focusing in particular in the portion of the South Plant between the existing rail corridor and the Delaware River (initial redevelopment parcel). The USEPA Environmental Indicators Determination for the South Plant found that there are no current unacceptable exposures to constituents associated with the South Plant, with the possible exception of shoreline sediments in the Delaware River. USEPA based its findings on a series of investigations conducted by Chemtrade and Honeywell as part of the RFI for the South Plant. The assessment and remediation of these shoreline sediments is well underway through a series of Interim Measures that either have been completed or are currently in progress. This report also summarizes the corrective action objectives for the South Plant defined as

the onshore portions of Tax Parcel ID 0607300002, and the anticipated attainment of those objectives for the southern portion of the South Plant by the planned integration of facility industrial redevelopment for soils with corrective actions (capping with protective institutional controls established and recorded pursuant to the State of Delaware's Uniform Environmental Covenants Act). Based on the planned nature of the redevelopment, this approach, in effect, constitutes a Presumptive Remedy as described in the March 2015 RCRA Toolbox document. The anticipated outcome is that USEPA will issue a Statement of Basis for soils in March 2016 for soils in the portions of the South Plant (onshore portions of Tax Parcel ID 0607300002) with capping in conjunction with the industrial redevelopment process as the Presumptive Remedy. An additional subsequent Statement of Basis for groundwater is anticipated after performance of a further investigation of fate and transport for groundwater.

1. INTRODUCTION

The Delaware Valley Works is located along the Pennsylvania-Delaware border (Marcus Hook, Pennsylvania and Claymont, Delaware, as shown on Figure 1). The Delaware Valley Works is comprised of a "North Plant" and a "South Plant". The North Plant on the north side of Philadelphia Pike (Route 13) is an active chemical manufacturing facility owned and operated by Honeywell International Inc. (Honeywell). The South Plant on the south side of Philadelphia Pike (Route 13) is a former chemical manufacturing facility currently owned and operated by Chemtrade Solutions LLC (Chemtrade). The Delaware Valley Works is the subject of an Initial Administrative Order (IAO) Docket No. RCRA-3-089CA, issued pursuant to the Resource Conservation and Recovery Act (RCRA) by the United States Environmental Protection Agency (USEPA) to General Chemical LLC, which previously owned and operated the South Plant. The effective date of the IAO is October 11, 2000. General Chemical was acquired by Chemtrade in 2014. Throughout the balance of this document, "Chemtrade" and "General Chemical" are used interchangeably. The properties that make up the Delaware Valley Works are distinguished by three USEPA ID numbers: 1) PAD981739758, the number for the North Plant; 2) PAD990823742, the number for the South Plant and a portion of the North Plant from 1986 to 2004; and 3) DED154576698, the number for the South Plant beginning in 2004. This report is specific to the South Plant, identified by USEPA ID No. DED154576698. In particular, this report addresses corrective measures for soils for the onshore portion of Parcel ID – 0607300002. The parcel is comprised of 27.48 acres, consisting of approximately 22 acres of land and approximately 5 riparian acres. The presumptive remedy described in this report is for the 22-acre onshore portion of the parcel.

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defined as the onshore portions of Tax Parcel ID 0607300002, and the anticipated attainment of those objectives for soils at the southern portion of the South Plant (i.e., the initial redevelopment parcel) by the planned integration of facility industrial redevelopment with corrective actions (capping with protective institutional controls established and recorded pursuant to the State of Delaware's Uniform Environmental Covenants Act). Based on the planned nature of the redevelopment, this approach, in effect, constitutes a Presumptive Remedy as described in the March 2015 RCRA Toolbox document. The anticipated outcome is that USEPA will issue a final Statement of Basis for soils in March 2016 for the portions of the South Plant (onshore portions of Tax Parcel ID 0607300002) with capping in conjunction with the industrial redevelopment process as the Presumptive Remedy. An additional subsequent Statement of Basis for groundwater is anticipated after performance of further investigation of fate and transport for groundwater.

1.1 SITE HISTORY

Chemical operations at the Delaware Valley Works began at the turn of the century. Land for the South Plant was purchased in 1910. Two years later, construction began on the sulfuric acid plant that marked the first commercial use of the contact or catalyst process. The plant began operations in 1913. The sulfuric acid and sulfur dioxide made in the plant formed the basis for all products at the South Plant. During World War I, the South Plant produced needed chemicals for the war effort. Increasing production prompted expansion into an idled chemical facility in 1940. This new segment, the North Plant, began operations in 1945.

The entire South Plant is located in Delaware, and approximately two-thirds of the North Plant is located in Pennsylvania and one-third in Delaware. The two plants were previously owned by Allied Chemical Corporation, which became Allied-Signal Inc. (Allied-Signal), and is now known as Honeywell. Allied-Signal transferred portions of the two plants, identified as Delaware Valley Works to General Chemical on May 21, 1986 (at that time, General Chemical's name was One Newco, Inc. which was changed to General Chemical Corporation in June 1986). General Chemical was acquired by Chemtrade in 2014. Chemtrade thereby became the owner of the South Plant at that time.

1.2 PROJECT OBJECTIVES AND REPORT ORGANIZATION

The purpose of this report is to support publication of a Statement of Basis by USEPA that will establish capping with institutional controls as an appropriate remedy under the RCRA Corrective Action Program for the initial redevelopment parcel. The initial redevelopment parcel is slated for industrial redevelopment starting in 2016. This report documents the following:

- The aggregated results of RFI work completed for the South Plant, which includes multiple phases of investigation with substantial input from USEPA. All of the data presented in this report was previously submitted to USEPA as described in Section 1.3.
- A summary of environmental conditions based on the RFI work, including a conceptual site model of soils and groundwater.
- The specific area of the South Plant proposed for capping as a Presumptive Remedy to address those conditions.
- The environmental protectiveness of the Presumptive Remedy.

Summaries of the South Plant RFI soil assessment activities and results are presented in Section 2. Section 3 summarizes the South Plant RFI groundwater assessment field activities and results. Section 4 presents a summary of environmental conditions and the conceptual site model for soils and groundwater. Section 5 documents the redevelopment area proposed for capping. Section 6 summarizes the environmental protectiveness of the presumptive remedy, including the institutional controls needed that will be established to assure and maintain protectiveness going forward.

1.3 RFI INVESTIGATION STATUS

As the initial technical requirement under the IAO, General Chemical submitted an RFI Work Plan for the Delaware Valley Works Facility to USEPA on December 10, 2000. On October 11, 2002, the RFI Work Plan was conditionally approved by USEPA. Field activities associated with the implementation of the RFI Work Plan were completed in July 2003. The results from these activities were evaluated and presented to the USEPA and DNREC at a meeting on November 7, 2003 at DNREC's offices. The presentation of the results also included recommendations for Phase II RFI activities, including those related to the shutdown of the South Plant. The results and proposed recommendations for Phase II RFI activities were presented in a document entitled "Summary of Presentation Items, General Chemical Corporation, Delaware Valley Works Facility, Claymont, Delaware, November 11, 2003" (Data Summary Report).

General Chemical received comments from USEPA on the Data Summary Report on December 9, 2004. On January 27, 2005, General Chemical and Honeywell met with USEPA and DNREC to discuss the comments. As agreed to during the meeting, General Chemical provided written responses in a letter dated March 31, 2005 to USEPA's technical review comment letter.

In a letter from USEPA dated June 28, 2005 and received by General Chemical on July 8, 2005, USEPA and DNREC provided an evaluation of the responses to comments in General Chemical's March 31, 2005 letter. USEPA agreed that the next step in the RFI process was the development of a draft Phase II RFI work plan to supplement the field investigation work completed to date. In addition, it was agreed that the draft Phase II RFI work plan would collectively address USEPA's technical review comments developed for the Data Summary Report and those documented in the enclosure to its June 28, 2005 letter.

In a letter dated April 11, 2006, USEPA and DNREC provided technical review comments on the draft RFI Phase II Work Plan dated September 16, 2005. General Chemical provided responses to USEPA's technical review comments in a letter dated June 16, 2006. In a letter dated September 7, 2006, USEPA and DNREC provided a technical evaluation of General Chemical's response. Following subsequent discussions between the parties, a letter dated September 14, 2006 from USEPA clarified its September 7, 2006 letter, and e-mail correspondences further addressed analytical and ecological risk assessment requirements. The RFI Phase II Work Plan (hereafter referred to as the Phase II Work Plan) was subsequently revised and submitted on October 27, 2006. Copies of the above-referenced correspondence were provided in Appendices A and B of the final Phase II Work Plan.

The Phase II Work Plan presented the proposed Phase II field investigations, a discussion of data evaluation and reporting activities, and a schedule for implementation related to additional soil and groundwater assessment activities for the South Plant. These activities were consistent with the recommendations provided in the Data Summary Report and subsequent comment/response correspondence with the USEPA.

In December 2006, Cummings/Riter and MACTEC Engineering & Consulting, Inc. (MACTEC), working on behalf of Honeywell, implemented the Phase II Work Plan. Cummings/Riter conducted soil sampling activities while MACTEC conducted the groundwater activities. All of the data was analyzed, and results were summarized within the RFI Phase II Report which was a joint submittal to the USEPA on June 20, 2007. USEPA reviewed the RFI Phase II Report and responded with comments to Cummings/Riter and MACTEC in a letter dated August 12, 2008. Cummings/Riter and MACTEC responded to the comments with a letter response to the USEPA dated November 3, 2008.

On September 19, 2008, USEPA collected limited Delaware River sediment samples within the tidal mudflats, adjacent to the General Chemical property (South Plant) and the Honeywell Delaware Valley Works Solid Waste Management Unit (SWMU) 9 (Figure 2). The sampling data indicated the presence of pesticides (primarily dichlorodiphenyltrichloroethane [DDT] and its isomers) and several metals (primarily arsenic and lead).

Based on subsequent discussions between the parties during the USEPA's site visit on February 25, 2009 and further consideration of meeting sampling objectives, General Chemical and Honeywell recommended to USEPA a one-time

re-sampling of the sediment (0- to 6-inch depth interval [bioactive zone only]) in the vicinity of the previously USEPA-sampled sediment locations. In an e-mail dated March 12, 2009, Mr. Russell Fish, of the USEPA, indicated that USEPA was amenable to this approach and subsequently approved the scope of work document entitled "Proposed Scope of Work, Sediment Re-Sampling, Honeywell International Inc., General Chemical Corporation, Claymont, Delaware, April 2009" in an e-mail dated May 5, 2009.

Some additional sediment sampling was implemented on June 11, 2009. Validated analytical results were provided to Mr. Fish in a letter from Mr. Richard Karr of MACTEC dated August 5, 2009.

After consultation with USEPA and DNREC, Cummings/Riter and MACTEC undertook additional sampling of shoreline sediment, the stormwater sluiceway, groundwater, and surface soils in July 2010. During that event, a total of 21 soil samples were collected from within SWMU 9 and along the lower sluiceway and southern boundary to the river. Also seven groundwater samples were collected from monitoring wells again in SWMU 9 area and towards the southern boundary by the river. In addition to the soil and groundwater samples collected, 29 sediment samples were collected from the confluence box down the sluiceway into the area between the dock and cove area. The results from this sampling event were submitted jointly by Cummings/Riter and MACTEC to USEPA on September 27, 2010 as a letter report and on September 30, 2010 as a CD containing the report (Appendix A). This investigation disclosed the presence of DDT, lead, and arsenic in the confluence box, sluiceway, and shoreline river sediment.

Considering the investigation results compiled through 2010, USEPA prepared and published an Environmental Indicators Determination for the Delaware Valley Works (USEPA ID No. DED154576698). That report evaluated the potential environmental exposure pathways at the facility based on then current (2011) conditions. The Environmental Indicators Determination concluded that potential human exposure (food chain uptake) to site related constituents in near-shore Delaware River sediment was the only unacceptable potential exposure pathway based on the current site use. The principal site-related source of impacts to river sediment was shown to be historical particulate migration through the site storm water systems, which collect runoff from both the North Plant and South Plant, and convey the flows to the Delaware River through a sluiceway. In response to this condition, the focus of RCRA Corrective Action Program efforts at the facility has since been to implement Interim Measures to mitigate this migration pathway and potential exposures to shoreline river sediment. The following activities have been undertaken (or are underway) to address potential exposures to site-related constituents in near-shore river sediment:

1. The removal (Interim Measure) of source material from within the storm sewers of both the North Plant and the South Plant, completed in 2012.
2. A site-specific risk assessment for river shoreline sediments, completed in 2012.
3. Sediment removal and capping of potential source materials (Interim Measure) for the upper portion of the sluiceway, completed in 2013.
4. Investigation of river shoreline sediments, with an effort to delineate to criteria established in the 2012 Risk Assessment (ongoing).
5. Capping of shoreline river sediment and the lower portion of the sluiceway (Interim Measure) to be undertaken based on the results of the ongoing river sediment characterization.

Chemtrade and Honeywell submitted a plan to complete the sampling of shoreline sediment to USEPA and DNREC on July 1, 2015, and have received approval to proceed with both this sampling and subsequent design/permitting of the shoreline capping remedy. The shoreline sampling was conducted in August 2015 and was reported to USEPA and DNREC in November 2015.

Based on a request by the USEPA, Woodard & Curran created a work plan and submitted it to USEPA and DNREC for approval to advance 20 additional soil borings in the initial redevelopment area to further assess arsenic in soils. Upon approval from USEPA and DNREC, the field work was conducted in December 2015.

2. RFI SOIL ASSESSMENTS

The RFI investigations (described in Section 1.3) focused on specific SWMUs addressed during the initial phase of the RFI and additional SWMUs and Areas of Concern (AOCs) identified following the shutdown of the South Plant (Figures 2 and 3). These investigations were undertaken by multiple organizations (Earth Science Consultants, MACTEC, Cummings/Riter, and Amec) from 2002 through present working on behalf of both Chemtrade and Honeywell. In general, soils investigations were undertaken by firms working on behalf of Chemtrade (Earth Science Consultants and Cummings/Riter), and groundwater investigations were undertaken by MACTEC, Amec Environment & Infrastructure, Inc., and Amec Foster Wheeler Environment & Infrastructure, Inc. (Amec Foster Wheeler). Assessment and remediation of the storm water migration pathway, and near-shore river sediment, are being addressed collaboratively by Chemtrade and Honeywell.

Based on discussions with USEPA conducted during report preparation, the assessment of soil conditions described in this report focuses on the portion of the South Plant slated for initial redevelopment (i.e., the initial redevelopment parcel). RFI data from Phase I investigation activities, Phase II investigation activities, and a supplementary 2010 investigation designed to address possible data gaps have been combined onto the figures of this report as practical for soils and groundwater.

Each of the RFI submittals (Section 1.3) assessed environmental data using screening levels approved for use as the work was undertaken. This report compiles all of the initial redevelopment parcel soil data from the RFI Report in aggregate in order to present a comprehensive picture of environmental conditions in soils at the initial redevelopment parcel. The units (i.e., micrograms per kilogram [µg/kg] or milligrams per kilogram [mg/kg]) used in the original submittals of these data have been retained and are also used in this report.

The 1986 RFA (RCRA Facility Assessment) documented the presence of 31 SWMUs at the South Plant. The RFI Phase I activities assessed 15 SWMUs (SWMUs 1, 2, 3, 4, 5, 6, 7, 8, 10, 11, 12, 26, 28, 31, and 32), and 4 AOCs (AOCs 1, 2, 3, and 4). The RFI Phase II activities assessed four SWMUs (SWMUs 33, 34, 35, and 36) along with 12 AOCs (AOCs 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, and 16) in addition to re-evaluating SWMUs 1, 3, and 5. The most comprehensive evaluation of the South Plant SWMUs and AOCs was conducted during Phase II. The locations of these SWMUs and AOCs are shown on Figure 3.

The list below documents the SWMUs and AOCs that are located in the southern portion of the South Plant (Tax Parcel ID 0607300002) that will be addressed by the presumptive redevelopment capping remedy (Figure 2).

- SWMU 1 - Former North Phosphoric Acid Pond
- SWMU 2 - South Phosphoric Acid Pond
- SWMU 5 - Former Spar Building Storage Area
- SWMU 6 - South Treatment Plant, Drum Storage
- SWMU 7 - Effluent Clarifier
- SWMU 8 - Effluent Clarifier
- SWMU 10 - South Waste Treatment Storage Pad
- SWMU 26 - South Waste Treatment Plant
- SWMU 35 - Former Hazardous Waste Storage Pad
- SWMU 36 - Former Debris Staging Area/Alum Plant Area

- AOC 2 - Acid Spill Area
- AOC 4 - Conrail Fuel Spill Area
- AOC 14 - Former Sulfuric Acid Storage Tank Area Sump

A summary of the RFI soil assessment activities on the initial redevelopment parcel is presented in Sections 2.1 and 2.2. A summary of conclusions and recommendations regarding the RFI soil results from the initial redevelopment parcel is presented in Section 2.3.

2.1 SOIL INVESTIGATION FIELD ACTIVITIES

Field methodologies and laboratory analyses were implemented in accordance with the approved Data Collection Quality Assurance Project Plan prepared as part of the original RFI Work Plan submittal. Tables 1 and 2 as presented in the RFI Phase II Report provide a summary of the RFI Phase II scope of work. These tables include the number of samples collected at each SWMU/AOC, sample depths, sample identifications, analytical program, and any deviations from the proposed plan. Soil sampling procedures, quality assurance/quality control (QA/QC) sampling, decontamination, and surveying of sample locations, along with the list of other procedures listed below, followed the standards approved by the USEPA, and are documented in the relevant work plans and in the reports.

2.2 SUMMARY OF SOIL ASSESSMENT RESULTS

Data collected during the RFI were evaluated to ensure that they met the scope of work objectives and provide adequate information to evaluate existing and potential future human health risks and impacts to groundwater quality.

Soil samples were analyzed for one or more of the following parameters (depending on the specific SWMU/AOC): volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), polycyclic aromatic hydrocarbons (PAHs), Appendix IX metals or select metals, polychlorinated biphenyls (PCBs), and pH. In addition, soil samples collected from SWMU 5 were analyzed for nine additional organic compounds including seven VOCs (1,4-dioxane, 2-methyl-1-propanol, acetonitrile, acrolein, dichlorofluoromethane, methacrylonitrile, and propionitrile) and two SVOCs (kepone and 4-nitroquinoline-1-oxide). The sample results for these analytes in soil samples collected during the RFI Phase I were rejected following data validation. During Phase II activities, those sample locations were resampled for the same set of nine organic compounds, and none of the analytes were detected. Given the supplemental sampling results, no additional constituents of concern (COCs) for SWMU 5 were identified.

In accordance with the Phase II Work Plan, soil analytical data were compared with screening criteria including USEPA Region III industrial risk-based concentrations (RBCs) as well as USEPA Region III's soil-to-groundwater pathway 10^{-6} risk-based soil screening levels (SSLs), Dilution Attenuation Factor = 20. As requested by USEPA, the tables summarizing the soil analytical results also include USEPA Region III residential RBCs for comparison purposes. Data validation was completed on 100 percent of the samples, and appropriate data qualifiers are presented in the data tables. Laboratory analysis reports for soil samples, data validation summaries, and QA/QC sample results are presented in Table 2-3 of the RFI Phase II Report.

The following subsections present a background description for each of the SWMUs/AOCs, a summary of the scope of work, and a summary of the analytical results. Tables 2-1 and 2-3 of the RFI Phase II Report provide summaries of the characterization program including the number of samples collected at each SWMU/AOC, sample depths, sample identifications, analytical program, and any deviations from the proposed plan. SWMU/AOC locations and soil sampling locations are shown on Figure 3.

The figures depict results that exceeded screening levels agreed to by USEPA. These screening levels indicate detections of significance to the RFI process, but do not in themselves indicate that unacceptable risks are present.

2.2.1 SWMU 1 - Former North Phosphoric Acid Pond

SWMU 1 is located in the southeastern portion of the South Plant within the initial redevelopment parcel (Figure 2). A detailed description of the unit was provided in the May 2002 RFI Work Plan. The basin was in use from about 1960 to 1984 and used initially to store phosphoric acid, and then as a settling basin for waste water collection/storage of acid-based processes within the National Pollutant Discharge Elimination System (NPDES) effluent system. The inside dimensions of the unit were approximately 50 feet by 60 feet, and the embankments of the unit were approximately 6 feet high. The unit was reportedly constructed with a liner system consisting of compacted clay soil overlain by several layers of asphalt and burlap. The pond was reportedly closed by backfilling with onsite fill and is currently covered with gravel.

Two surface soil samples (below the gravel layer) were collected at this SWMU during RFI Phase I activities. To evaluate subsurface soil conditions for this SWMU, continuous soil samples were collected from the ground surface to the water table during RFI Phase II activities including the collection of four soil samples at two locations (Figure 3). At each sample location, a soil sample from the clay liner and a soil sample from below the liner were to be collected. However, the liner was only encountered at one location (SWMU 1-2). Groundwater was encountered prior to encountering the clay liner at the second location; therefore, the soil samples were collected within the approximate 3- to 6-foot depth intervals of approximately 3 to 6 feet below ground surface (bgs). The soil samples were analyzed for Appendix IX metals and pH.

In the four subsurface soil samples collected at SWMU 1, concentrations were above screening criteria for the following parameters: antimony, arsenic, chromium, lead, and thallium. The following list summarizes these exceedances:

- The concentrations reported for antimony in two of the samples (14.1 mg/kg and 15.0 mg/kg) slightly exceeded the corresponding SSL (13 mg/kg).
- The concentrations reported for arsenic in all four samples (ranging from 76.1 to 158 mg/kg) exceeded the corresponding industrial RBC (1.9 mg/kg) and SSL (0.026 mg/kg).
- Two of the samples detected chromium at concentrations (44.4 mg/kg and 50.0 mg/kg) slightly above the corresponding SSL (42 mg/kg).
- An exceedance for lead was detected in one sample at a concentration of 1,060 mg/kg above the corresponding industrial RBC (800 mg/kg).
- The concentration reported for thallium in one of the samples (4.19 mg/kg) slightly exceeded the corresponding SSL (3.6 mg/kg).

Table 2-4 presented in the RFI Phase II Report summarizes the results of the soil samples collected in SWMU 1 during the Phase I and Phase II RFI activities. Figures 4 and 5 illustrate the distribution of arsenic and lead, respectively, across the initial redevelopment parcel, including SWMU 1. Exceedances of screening levels for antimony, chromium, and thallium across the initial redevelopment parcel are summarized on Figure 7, including SWMU 1.

2.2.2 SWMU 2 - South Phosphoric Acid Pond

This SWMU was inspected during Phase I of the RFI, and no exposed soil was evident, as concrete and asphalt covered the entire area of the unit. There was no evidence or documentation of a release at SWMU 2. Therefore, sampling was not undertaken.

2.2.3 SWMU 5 - Former Spar Building Storage Area

The former Spar Building Storage Area is located at the south central portion of the South Plant within the initial redevelopment parcel (Figure 2). The area was used to store miscellaneous plant wastes, construction materials, and

non-hazardous off-grade products primarily in drums. During its use, the storage area had an asphalt base. After it became inactive, fill material and gravel were placed over the entire area.

2.2.3.1 Phase I RFI Soil Sampling

Phase I RFI activities focused initially on determining the integrity of the asphalt paving by using a backhoe to displace the overlying debris. The asphalt paving was identified at approximately 1.0 to 1.5 feet bgs and in a deteriorated condition. Therefore, four soil samples were collected for laboratory analysis at four different locations immediately beneath the asphalt pavement (Figure 3). Because of the depth of the overlying debris, RFI Phase I samples were actually collected from a depth of approximately 1.5 to 2.0 feet bgs at each location.

Samples were analyzed for VOCs, SVOCs, Appendix IX metals, mercury, and pH. RFI Phase I soil sample results are summarized in Table 2-6 presented in the RFI Phase II Report. The constituents of potential concern identified in the samples included arsenic, mercury, lead, and PAHs. In addition, laboratory results for nine organic compounds in soil samples collected during the RFI Phase I were rejected following data validation. These organic compounds included seven VOCs (1,4-dioxane, 2-methyl-1-propanol, acetonitrile, acrolein, dichlorofluoromethane, methacrylonitrile, and propionitrile) and two SVOCs (kepone and 4-nitroquinoline-1-oxide).

2.2.3.2 Phase II RFI Soil Sampling

Phase II RFI activities at this SWMU included the collection of 43 additional soil samples from 16 locations to determine the source and extent of the constituents of potential concern and to evaluate potential impacts from surface water runoff in the area. The soil sampling program at SWMU 5 included the following:

- Collection of four surface soil samples (0- to 6-inch depth interval) at the RFI Phase I sampling locations (SWMU 5-1 through SWMU 5-4). The results of these surface soil samples provided data for evaluating the potential soil-to-industrial-worker exposure pathway, and were analyzed for arsenic, lead, mercury, PAHs, and the nine additional organic compounds.
- Collection of four deeper soil samples (1.5 to 2.0 feet bgs) from the same approximate location and depth intervals as the RFI Phase I sampling locations (SWMU 5-1 through SWMU 5-4). These samples were analyzed for the nine organic compounds for which sampling results obtained during Phase I RFI activities at SWMU 5 were rejected during the data validation process for the Phase I RFI activities as described in Section 2.2.3.1.
- Collection of additional soil samples representing the 4- to 6-foot depth interval at the RFI Phase I sample locations. Samples from this interval were collected at Sample Locations SWMU 5-3 and SWMU 5-4. These samples were analyzed for arsenic, lead, mercury, and PAHs. Samples from this depth interval could not be collected at the SWMU 5-1 and SWMU 5-2 locations because Geoprobe® refusal was encountered prior to reaching the target depth.
- Collection of 12 additional surface soil samples to define the lateral extent of constituents of potential concern in the vicinity of SWMU 5 (identified as SWMU 5-5 through SWMU 5-16). The 12 sampling locations were spatially distributed around the general perimeter of the SWMU, as well as within the area between the railroad spur and SWMU 9. These samples were analyzed for arsenic, lead, mercury, and PAHs.
- Collection of two subsurface soil samples at each of the 12 additional surface soil sampling locations representing the 2- to 4- and 4- to 6-foot depth intervals. Chemical analyses of these subsurface soil sample locations were completed where overlying soil sample results for arsenic, lead, mercury, and/or individual PAHs were detected above SSLs or industrial RBCs. The chemical analyses for these samples were performed only for the specific constituents detected above an associated standard. Several PAHs exceeded their respective standards, but deeper samples were not analyzed since the sample exceeded laboratory

holding times for this analysis. However, as discussed in the sample result section (Section 2.2.3.3) for this SWMU and Section 2.3, not analyzing these additional samples did not affect the conclusions regarding characterization. Also, at Borings SWMU 5-7 and SWMU 5-15, samples were not collected from both depth intervals. Refusal was encountered at 4 feet bgs in Boring SWMU 5-7 and at 2 feet bgs in Boring SWMU 5-15.

- None of the nine additional organic constituents were detected in the shallow soil samples at concentrations above applicable screening criteria.

Table 2-2, presented in the RFI Phase II Report, summarizes the samples collected at SWMU 5, their depth, sample identification, and parameters analyzed. Additionally, RFI Phase II soil sampling locations for SWMU 5 are shown on Figure 3.

2.2.3.3 SWMU 5 Sample Results

At total of 43 samples were collected from the SWMU 5 area. For soil samples collected at this SWMU, concentrations were above screening criteria for the following parameters: arsenic, lead, naphthalene, benzo(a)anthracene, benzo(b)fluoranthene, benzo(a)pyrene, dibenz(a,h)anthracene, and indeno(1,2,3-cd)pyrene. The following list summarizes these exceedances:

- Arsenic was detected in each of the 39 samples analyzed for this parameter at concentrations ranging from 6.79 to 957 mg/kg which each exceed the corresponding industrial RBC (1.9 mg/kg) and SSL (0.026 mg/kg).
- Lead was detected at levels exceeding screening criteria in 21 of the 39 samples analyzed for this parameter. Lead was detected in these soil samples at concentrations ranging from 834 to 14,100 mg/kg which are above the corresponding industrial RBC (800 mg/kg).
- Naphthalene was detected at levels exceeding screening criteria in 2 of the 17 samples analyzed for this parameter. Naphthalene was detected in these two soil samples at concentrations of 580 µg/kg and 620 µg/kg, respectively, which are above the corresponding SSL of 150 µg/kg.
- Benzo(a)anthracene was detected at levels exceeding screening criteria in 14 of the 19 samples analyzed for this compound. Benzo(a)anthracene was detected in these soil samples at concentrations ranging from 560 to 10,000 µg/kg which are above the corresponding SSL (480 µg/kg) and/or industrial RBC (3,900 µg/kg).
- Benzo(b)fluoranthene was detected at levels exceeding screening criteria in 7 of the 22 samples analyzed for this compound. Benzo(b)fluoranthene was detected in these soil samples at concentrations ranging from 2,400 to 11,000 µg/kg which are above one or both of the corresponding SSL (1,500 µg/kg) and industrial RBC (3,900 µg/kg).
- Benzo(a)pyrene was detected at levels exceeding screening criteria in 29 of the 35 samples analyzed for this compound. Benzo(a)pyrene was detected in these soil samples at concentrations ranging from 130 to 8,300 µg/kg which are above the corresponding SSL (120 µg/kg) and/or industrial RBC (390 µg/kg).
- Dibenz(a,h)anthracene was detected at levels exceeding screening criteria in 4 of the 22 samples analyzed for this compound. Dibenz(a,h)anthracene was detected in these soil samples at concentrations ranging from 530 to 1,200 µg/kg which are above the corresponding SSL (460 µg/kg) and industrial RBC (390 µg/kg).
- Indeno(1,2,3-cd)pyrene was detected at levels exceeding screening criteria in 1 of the 19 samples analyzed for this compound. Indeno(1,2,3-cd)pyrene was detected in this soil sample at a concentration of 6,500 µg/kg which exceeds the corresponding SSL (4,200 µg/kg) and industrial RBC (3,900 µg/kg).

Table 2-7, presented in the RFI Phase II Report, presents summaries of the soil sample analytical results for the samples collected in SWMU 5 during the RFI Phase II activities. Figures 4, 5, and 6 illustrate the distribution of arsenic,

lead, and benzo(a)pyrene, respectively, throughout the initial redevelopment parcel, including the SWMU 5 area. Exceedances of screening criteria for other parameters in the SWMU 5 area are shown on Figure 7.

2.2.4 SWMU 6 - South Treatment Plant, Drum Storage

This SWMU was inspected during Phase I of the RFI. There was no indication of a release, and no exposed soil was evident, as concrete covered the entire area of the unit. Therefore, sampling was not undertaken.

2.2.5 SWMU 7 - Effluent Clarifier

This SWMU was inspected during Phase I of the RFI, and no exposed soil was evident, as concrete and asphalt covered the entire area of the unit. There was no indication of a release. Therefore, sampling was not undertaken.

2.2.6 SWMU 8 - Effluent Clarifier

This SWMU was inspected during Phase I of the RFI. During this investigation, the clarifier tank was observed to have a concrete foundation, and has asphalt covering the area surrounding the tank. With no exposure pathway present in SWMU 8 and no documented releases, no samples were collected.

2.2.7 SWMU 10 - South Waste Treatment Storage Pad

This SWMU was inspected during Phase I of the RFI. There was no indication of a release, and no exposed soil was evident, as concrete covered the entire area of the unit. Therefore, sampling was not undertaken.

2.2.8 SWMU 26 - South Waste Treatment Plant

This SWMU was inspected during Phase I of the RFI. No indication of a release, and no exposed soil was evident, as concrete and asphalt covered the entire area of the unit. Therefore, sampling was not undertaken.

2.2.9 SWMU 35 - Former Hazardous Waste Storage Pad

SWMU 35 is located in the southeastern portion of the South Plant within the initial redevelopment parcel (Figure 2). The former Hazardous Waste Storage Pad was constructed in the mid-1980s and covers an area approximately 30 feet by 50 feet. The pad was paved at the time of its initial construction and repaved in the 1990s. Wastes stored on the pad primarily consisted of waste oils and miscellaneous chemicals. Wastes were primarily contained within 55-gallon drums. There have been no documented releases associated with this SWMU.

RFI Phase II activities included the collection of four surface samples (0- to 6-inch depth interval); one centrally located along each side of the pad (total of four samples). Samples were collected using a hand auger. Each sample was analyzed for VOCs, SVOCs, Appendix IX metals, and PCBs. Sample locations are shown on Figure 3.

Concentrations were above screening criteria were detected for the following parameters: arsenic, chromium, benzo(a)anthracene, benzo(b)fluoranthene, benzo(a)pyrene, dibenz(a,h)anthracene, and PCB-1254. The following list summarizes these exceedances:

- Arsenic was detected in all four samples from this SWMU at concentrations ranging from 9.69 to 46.2 mg/kg which exceed the corresponding industrial RBC (1.9 mg/kg) and SSL (0.026 mg/kg).
- Chromium was detected in each of the four samples collected from this SWMU at concentrations ranging from 63.8 to 85.4 mg/kg which exceed the corresponding SSL (42 mg/kg).

- Benzo(a)anthracene was detected in all four samples collected from this SWMU at concentrations ranging from 500 to 4,700 µg/kg which are above the corresponding SSL (480 µg/kg) and/or industrial RBC (3,900 µg/kg).
- Benzo(b)fluoranthene was detected in three of the four samples collected from this SWMU at concentrations ranging from 1,900 to 6,000 µg/kg which are above the corresponding SSL (1,500 µg/kg) and/or industrial RBC (3,900 µg/kg).
- Benzo(a)pyrene was detected in all four samples collected from this SWMU at concentrations ranging from 520 to 4,800 µg/kg which are above corresponding SSL (120 µg/kg) and/or industrial RBC (390 µg/kg).
- Dibenz(a,h)anthracene was detected at levels above screening criteria in two of the four samples collected from this SWMU. Dibenz(a,h)anthracene was detected at concentrations of 420 and 860 µg/kg in these two samples which are above the corresponding industrial RBC (390 µg/kg) and/or SSL (460 µg/kg).
- PCB-1254 was detected at levels above screening criteria in two of the four samples collected from this SWMU. PCB-1254 was detected at concentrations of 2,400 and 8,100 µg/kg in these two samples which are above the corresponding SSL (1,100 µg/kg) and industrial RBC (1,400 µg/kg).

Table 2-9, presented in the RFI Phase II Report, summarizes the results of the soil samples collected during the Phase II RFI activities. Figures 4 and 6 illustrate the distribution of arsenic and benzo(a)pyrene exceedances of screening criteria at SWMU 35. Figure 7 shows the location of exceedances of screening criteria for the other parameters at this SWMU.

2.2.10 SWMU 36 - Former Debris Staging Area/Alum Plant Area

The Debris Staging Area was formerly located adjacent to and south of the former Alum Plant (Figure 2). The Alum Plant made both liquid and dry alum (aluminum sulfate) from bauxite and sulfuric acid, or hydrate and sulfuric acid. Based on an inspection of this staging area prior to submitting the "Data Summary Report" in November 2003, additional work was not proposed for this area as noted in that report. As part of plant decontamination activities, the Alum Plant and associated structures were razed. As a result of these activities, several feet of fill material from the demolition of the buildings currently exists across the footprint of the former structures. The footprint of this area is approximately 200 feet by 350 feet, and the area is shown on Figure 2. Concrete pavement (i.e., floors, footers, and pads) remain in place beneath the fill material. Based on the historical operations at the former Alum Plant, it is possible that constituents within the fill material are at levels of potential interest.

Phase II RFI soil samples were collected to evaluate surface soil quality across this area. A total of eight surface soil samples (0- to 6-inch depth interval) were collected across the area. Each sample was analyzed for Appendix IX metals and pH. Sample locations are shown on Figure 3.

Arsenic and chromium were found at concentrations were above screening criteria in soils at SWMU 36. The following list summarizes these exceedances:

- Arsenic was detected in all eight samples from SWMU 36 at concentrations ranging from 3.21 to 20.8 mg/kg which exceed the corresponding industrial RBC (1.9 mg/kg) and SSL (0.026 mg/kg).
- Chromium was detected in four of the eight samples collected from SWMU 36 at levels above screening criteria. Chromium was detected at concentrations ranging from 43.7 to 146 mg/kg in these four samples which exceed the corresponding SSL (42 mg/kg).

Table 2-10, presented in the RFI Phase II Report, summarizes the results of the soil samples collected during the Phase II RFI activities that exceeded screening criteria. Figure 4 shows the distribution of arsenic at SWMU 36, and Figure 7 shows the distribution of chromium at SWMU 36.

2.2.11 AOC 2 - Acid Spill Area

During the Phase I RFI, inspections were completed on the AOCs, including AOC 2, to determine if they were structurally sound. AOC 2, which has concrete covering the area, had no exposure pathways for soil to industrial worker contact. With no exposure pathway present in AOC 2, no samples were collected.

2.2.12 AOC 4 - Conrail Fuel Spill Area

Visual observation of the surface soils associated with AOC 4 indicated that an exposure pathway from soil to industrial worker was present. Therefore, two soil samples were collected (0 to 6 inch) at AOC 4 and analyzed for Appendix IX metals, VOCs, and SVOCs. None of these analytes were detected at concentrations exceeding screening criteria in the two soil samples.

2.2.13 AOC 14 - Former Sulfuric Acid Storage Tank Area Sump

This AOC is located within the southwestern portion of the facility within the initial redevelopment parcel (Figure 2) and consists of four aboveground storage tanks used to store sulfuric acid. The tanks are surrounded by concrete containment, and adjacent areas are concrete or asphalt paved. A sump is present within the eastern portion of the tank containment area. The sump is approximately 3 feet in depth.

As part of RFI Phase II activities, the sump was inspected. Prior to inspection, water and sediment that had accumulated in the sump since decommissioning were removed using a vacuum truck. Following coring through the base of the sump, a soil sample was collected from beneath the sump. The sample was analyzed for Appendix IX metals and pH.

Arsenic, antimony, and thallium were detected at this location at concentrations above screening criteria. Arsenic was detected at a concentration of 946 mg/kg in the primary sample and at a concentration of 2,300 mg/kg in a duplicate sample from this location, both of which exceed the corresponding industrial RBC (1.9 mg/kg) and SSL (0.026 mg/kg). Antimony was detected in the duplicate sample from this location at a concentration of 23.8 mg/kg which slightly exceeds the corresponding SSL (13 mg/kg). Thallium was detected in the duplicate sample from this location at a concentration of 7.24 mg/kg which is slightly above the corresponding SSL (3.6 mg/kg).Table 2-14, presented in the RFI Phase II Report, summarizes the results of the soil samples collected during the Phase II RFI. Figure 4 shows the concentration of arsenic at this location relative to other areas in the initial redevelopment parcel. Exceedances of screening criteria for antimony and thallium in the area of AOC 14 are shown on Figure 7.

2.3 SUMMARY OF PHASE I AND PHASE II RFI FINDINGS, SOUTH PLANT SOILS

Based on the data evaluation presented above, the primary constituents found in soils above applicable screening criteria across the initial redevelopment parcel were limited to arsenic, lead, and one PAH [benzo(a)pyrene]. Several other metals such as antimony (three samples), thallium (two samples), and chromium (10 samples) were also detected. However, the concentrations of each of these metals were below their respective RBCs and were only slightly higher than their respective SSL values.

Isolated detections were also found for several other organic compounds. In addition to benzo(a)pyrene, several other PAHs were detected above screening criteria. These additional PAHs were all found in the SWMU 5 and SWMU 35 areas and likely represent impacts from historical fill materials placed in this area. Two sample locations contained low levels of PCBs, only slightly higher than the corresponding RBC or SSL. In addition, two sample locations contained low levels of dieldrin that only slightly exceed the corresponding SSL of 0.11 mg/kg.

Figure 4 illustrates the distribution of arsenic throughout the initial redevelopment parcel based on the Phase II RFI soil sampling activities. It is apparent from this figure that no discernible pattern associated with past operations associated with SWMUs for the site wide distribution of arsenic emerges. Although arsenic concentrations for each sample

exceeded the RBC and SSL, most of the samples outside of the SWMU 1 and SWMU 5 areas contained arsenic at concentrations of less than 50 mg/kg. Several detections of arsenic were found in the central portion of the initial redevelopment parcel that ranged between 100 and 200 mg/kg. One sample collected at AOC 14 had a relatively high concentration of arsenic. Within SWMU 1, arsenic concentrations ranged from approximately 75 to 200 mg/kg.

Arsenic was most pervasive in the SWMU 5 area ranging in concentration from 6.8 to 957 mg/kg. Of the 39 samples analyzed, 15 samples contained arsenic at concentrations ranging from 6.87 to 100 mg/kg, 18 samples contained arsenic at concentrations ranging from 100 to 500 mg/kg, and 6 samples contained arsenic at concentrations ranging from 500 to 957 mg/kg. The lateral and vertical distribution of arsenic across the sampling area was highly variable and did not indicate that its presence was from a single source.

Comparison of arsenic concentrations within each unit as well as between AOCs and SWMUs also shows a relatively high variability in concentration and depth. Based on the historical operations of the facility, the likely source of the arsenic found across the initial redevelopment parcel, including SWMU 5, dates from the early years of facility operation and is either from the former storage and management of pyritic ores or the placement, storage and/or deposition of pyritic ore cinders as historic fill in these areas. The pyritic ore cinders were generated during the burning of the ore as part of the sulfuric acid manufacturing process and are expected to have higher arsenic concentrations than the raw ore product. The overall distribution of arsenic is not surprising given the age of the facility relative to the management of these materials and the likely spread of these materials from general handling practices, site filling and leveling, construction, excavation and grading, and similar site activities.

Figure 5 illustrates the distribution of lead at concentrations above applicable screening criteria across the initial redevelopment parcel. Most of the higher concentrations of lead found within the initial redevelopment parcel were within the SWMU 5 area. It is believed that the source of the lead in this area is also associated with the historical management of pyritic ore or pyritic ore cinders.

Figure 6 illustrates the distribution of benzo(a)pyrene in all areas sampled in the initial redevelopment parcel. Except for six locations, the presence of this compound was limited to the SWMU 5 area. Benzo(a)pyrene and other PAHs are common constituents in fill/soil materials at industrial facilities. Benzo(a)pyrene occurs ubiquitously in the environment from the incomplete combustion of fossil fuels, which is primarily released to the air and subsequently deposited onto the ground. It is also a constituent in coal tar which is used in asphalt paving, railroad ties, and roofing materials. Asphalt paving materials were present in the fill materials encountered during sampling as would be expected based on the history of the South Plant. There are no known uses of this specific compound in past operations at the South Plant.

In summary, arsenic, lead, and benzo(a)pyrene were found to be the most prevalent constituents detected across the initial redevelopment parcel. Based on the historical knowledge of the initial redevelopment parcel, it is anticipated that the presence of arsenic and lead are primarily associated with the past use of pyritic ores in the manufacturing process of sulfuric acid during early operational years or historical fill placement. Benzo(a)pyrene is a common constituent in fill at industrial sites, and appears unrelated to past historical operations at the South Plant. The Phase II RFI Report concluded that management of possible risks associated with these potential COCs in soil can be addressed in conjunction with future site industrial use and specific redevelopment activities; therefore, no additional soil sampling was recommended.

2.4 2010 RFI PATHWAYS INVESTIGATION (SOILS AND SEDIMENT)

Based upon review of the combined Phase I and Phase II RFIs, USEPA requested additional sampling and analysis of soils and sediment from specific locations. The purpose of this effort was to further assess the surface water transport pathway, which was believed to be a potentially important transport pathway for impacted particulates depositing in the near-shore area sediment of the Delaware River immediately adjacent to the South Plant. Cummings/Riter and MACTEC developed a work plan which was submitted and subsequently approved by the USEPA on May 27, 2010 to

be the governing document for the work to complete the additional sampling. Twenty-one additional soil samples were collected along the shoreline area of the South Plant and across the surface of SWMU 9, which is not part of the South Plant, is not owned by Chemtrade, and is not included in this RFI Summary. The sample locations were selected biased to local concentrated flow areas with potential to erode and transport soil particles. Of these 21 soil samples, five samples were collected along the lower sluiceway and between the dock and lower sluiceway (Figure 3). All of these samples were surface samples collected at depth intervals of zero to six inches. Additionally, 19 sediment samples were obtained from the confluence box, the sluiceway, and from the nearshore river areas to directly address these areas.

2.5 RESULTS OF 2010 PATHWAYS INVESTIGATION OF SOILS AND SEDIMENT

Of the 21 soil samples collected, four sample locations had no screening level exceedances; they were located in the interior of SWMU 9. Arsenic was detected at concentrations exceeding screening levels in the remaining samples (Figure 4).

The five soil samples located along the lower sluiceway and between the dock and lower sluiceway each contained arsenic at concentrations exceeding applicable screening levels (Figure 4). Two sample locations (SP-20 and SP-21) near AOC 14 contained arsenic at concentrations of 5,520 mg/kg and 102 mg/kg, both of which exceed the corresponding industrial RBC (1.9 mg/kg) and SSL (0.026 mg/kg). Dieldrin was detected at concentrations slightly above the carcinogenic industrial RSL in Samples SP-17 and SP-19 (Figure 7). Lead was the only other constituent detected at concentrations exceeding applicable screening levels. Lead was detected in three samples (SP-18, SP-20, and SP-21) (Figure 5) at concentrations of 3,590 mg/kg, 2,410 mg/kg, and 1,280 mg/kg, respectively. No carcinogenic industrial RSL is listed for lead, but the concentrations of lead in the three samples exceeded the non-cancer industrial RSL by an order of magnitude.

All sediment samples from the confluence box and sluiceway contained DDT isomers, lead, and arsenic at concentrations exceeding sediment screening criteria.

The tables and figures from the 2010 investigation with these results are documented in the letter report submitted to the USEPA on September 27, 2010 (Appendix A). Based on the results from this sampling event along with the previous sampling events, no additional data were requested by USEPA for soils. However, the focus of the RCRA Corrective Action Program for soils at the Delaware Valley Works shifted to assessing and remediating the shoreline river sediment and the surface water pathways for particulate migration (storm sewers at both the North and South Plants and the sluiceway conveying the flow from these systems through the South Plant to the Delaware River).

These efforts have been undertaken as RCRA Interim Measures, and are ongoing.

2.6 2015 ADDITIONAL SOIL INVESTIGATION

Based on a request by the USEPA, Woodard & Curran developed a work plan and submitted it to USEPA and DNREC for approval to complete 20 additional borings in the initial redevelopment area to further investigate arsenic levels in soils. Upon approval from USEPA and DNREC, the field work was conducted in December 2015. Each soil boring was advanced by direct-push techniques to groundwater. Two to three soil samples were collected at each soil boring. A total of 53 samples were collected from the 20 soil borings at different depths. The concentrations for arsenic ranged from 3.6 to 29,000 mg/kg. The full report of this work is provided in Appendix B.

3. RFI GROUNDWATER INVESTIGATIONS

3.1 GROUNDWATER INVESTIGATION FIELD ACTIVITIES

Groundwater is discussed in this document in order to address all potential migration pathways associated with soils, including possible soil to groundwater cross-media migration. The following discussions are included to enable consideration of that potential pathway. Due to the nature of groundwater flow, based on discussions with USEPA during report preparation, this assessment addresses groundwater conditions beneath the entire South Plant, including areas to the north of the initial redevelopment parcel.

The primary objective for RFI groundwater characterization was to evaluate water quality within the uppermost water-bearing zone. The initial RFI phase employed a total of 32 monitoring wells (15 existing and 17 new) located in both the North and South Plants to assess groundwater conditions. The results of the initial phase of RFI groundwater characterization were documented in the Phase I RFI Report. Based upon review of these results, a subsequent groundwater sampling effort was conducted specifically by MACTEC on behalf of Honeywell for the South Plant under the Phase II RFI, as described in the RFI Phase II Work Plan.

This groundwater sampling was conducted to further assess groundwater quality, and to assess the extent of groundwater impacts within the area of select existing monitoring wells in and near the South Plant as described in the RFI Phase II Work Plan. In order to better consider stratigraphy, continuous soil samples were collected from one representative boring from each Phase II groundwater sampling area and logged. An exception to this was AOC 11, where continuous samples were not collected[1]. Boring logs, the laboratory analysis data report, and the full data validation report are presented in the RFI Phase II Report.

3.1.1 Sampling Methodology

The Phase II RFI groundwater sampling was conducted using a Geoprobe® rig equipped with a Hydropunch® sampler. The Phase II Work Plan called for the Hydropunch® sampler to be advanced to a depth approximately 5 feet below the water table at each location; the depth of the water table below the ground surface was estimated to be generally in the range of 9 to 12 feet bgs. In several instances, the depth below the ground surface where the sample was collected varied from the Phase II Work Plan.

The groundwater samples were collected using a peristaltic pump with dedicated disposable tubing using USEPA low-flow procedures, and the analyses of the samples followed the description in the approved Phase II Work Plan. The samples were identified with a unique alphanumeric code and shipped for analysis under chain-of-custody control to Lancaster Laboratories, Inc., a certified analytical laboratory.

At several Hydropunch® sampling locations, the water-bearing zone failed to yield sufficient water to collect a sample at the proposed sampling depth of approximately five feet below the water table. Where this occurred, the probe was advanced to greater depths until a zone that would yield sufficient water was encountered. The following sampling locations deviated from the Phase II Work Plan:

- **W112-HP04** - After attempting to sample groundwater five feet below the water table, it was determined that the water-bearing zone would not produce sufficient water at that depth. Multiple attempts were made at acquiring a groundwater sample to 14 feet below the water table, when it was determined that the yield was

[1] The shallow depth to groundwater and potential presence of buried utilities precluded continuous sample collection.

too low, even at that depth to collect a sample. Samples were collected from the other three W112 groundwater sampling locations and analyzed for their respective parameters.

- **W106-HP04** - The water-bearing zone only yielded sufficient water to collect VOC and SVOC samples. After collection of the VOC and SVOC samples, the borehole failed to recharge; however, sufficient water was obtained in the other three W106 sampling locations for analysis of their respective parameters.
- **SAL3-HP01** - After attempting to collect a groundwater sample five feet below the water table, it was determined that the water-bearing zone would not produce sufficient water at that depth. Multiple attempts were made at acquiring a groundwater sample to 17 feet below the water table, when it was determined that the yield was insufficient, even at that depth to collect a sample. Samples were collected from three of the remaining four SAL-3 sampling locations.
- **SAL3-HP02, HP03, and HP04** - Hydropunch® locations were off-set as many as two times from each planned location after encountering subsurface refusal.
- **SAL3-HP05** - The Hydropunch® location was off-set five times due to encountering subsurface refusal before abandoning the location without collecting a groundwater sample.
- **W114-HP01** - The Hydropunch® location was off-set due to buried utilities.
- **W114-HP02** - After attempting to collect a groundwater sample five feet below the water table, it was determined that the water-bearing zone would not produce sufficient water at that depth. Multiple attempts were made at acquiring a groundwater sample to 20 feet below grade, when it was determined that the yield was insufficient, even at that depth to collect a sample. Samples were collected from the one other W114 sampling location.

Due to the difficulty in collecting sufficient water from the shallow water-bearing zone, a soil sample was collected for grain-size analysis from within the saturated zone of W106-HP03 at a depth of 10 to 12 feet bgs. The sample analysis was performed according to American Society for Testing of Materials (ASTM) D 422. The test results indicated the presence of a high percentage of fine grained materials with 56.7 percent silt, 2.6 percent clay, and 14.9 percent fine sand (i.e., passing a #40 sieve). These data suggest that a predominance of fine grained soils may be limiting formation yield at several of the borehole locations. The particle size report is included as part of the laboratory analysis data report presented in the RFI Phase II Report.

All of the procedures listed below were approved by USEPA and are located in the work plans and reports.

- QA/QC Sampling
- Decontamination
- Survey of Sample Locations

3.1.2 Temporary Piezometers & Temporary Piezometer Sampling (Phase II RFI)

Four temporary piezometers were installed using the hollow-stem auger (HSA) drilling method. Soil samples were collected in accordance with ASTM D 1586 99 Standard Test Method for Penetration Test and Split-Barrel Sampling of Soils. Continuous split-spoon sampling was conducted in advance of the augers. Upon retrieving the spilt-spoon sampler, each soil sample was visually classified and scanned with a photo-ionization detector (PID). All pertinent observations were recorded in a bound field book. The Work Plan required that soil samples be submitted for laboratory analyses if severely visually impacted soil was unexpectedly encountered. No such visually identifiable severely impacted soils were encountered, and no soil samples were submitted for laboratory analysis. The actual completion depth and length of screen were determined based on field observations.

The temporary piezometers were constructed of 2-inch diameter Schedule 40 polyvinyl chloride (PVC) with a 10-foot section of 0.010-inch slot PVC and a general completion depth of around 20 feet bgs. The temporary piezometers were

placed so that the screened interval extended to approximately 5 feet below the water table. The annular space around the screen was backfilled with #1 Morie sand to approximately 2 feet above the screened interval. Two feet of bentonite pellets were installed above the sand pack and hydrated. Upon placement of a bentonite seal, the borehole annulus was grouted to grade with slurry of about 95 percent Portland Cement/5 percent bentonite grout. Each of the temporary piezometers was completed with a protective flush-mount well cover set in a 2 foot by 2 foot by 0.5-foot well pad.

All soil cuttings were collected and placed in 55-gallon drums. All cuttings materials were disposed off-site in accordance with state and federal regulations.

The new temporary piezometers were developed using the pump and surge technique. After surging, a submersible pump was lowered into each piezometer and repeatedly raised and lowered throughout the screened interval until water quality parameters and the turbidity of the development water stabilized and no further variations were noted.

Prior to sampling, the depth to water and total depth of the onsite monitoring wells and piezometers were measured to the nearest 0.01 foot using a depth to water meter equipped with a water/product interface probe to evaluate whether light non-aqueous phase liquid (LNAPL) was present. Groundwater was purged from each of the new temporary piezometers using new, dedicated disposable polyethylene tubing. The flow rate during purging was measured by the timed volume method by observing the time to fill a 100-milliliter (ml) graduated cylinder. Purge water was collected into 5-gallon buckets and stored in 55-gallon Department of Transportation hazardous waste certified drums.

During purging, pH, specific conductivity, dissolved oxygen, temperature, and turbidity readings were measured using a Horiba U-22 water quality meter. Depth-to-water readings were also recorded using a Solinist water level indicator. Stabilization of parameters for three consecutive readings of pH (+/- 0.1 standard units), specific conductivity (+/- 3 percent), dissolved oxygen (+/- 10 percent), temperature (+/- 3 percent) and turbidity (+/- 10 percent) was considered complete, provided at least five measurements had been taken.

3.2 RESULTS OF GROUNDWATER INVESTIGATION

3.2.1 Monitoring Well MW-115 Area

Monitoring well MW-115 area is located in the northern portion of the South Plant outside the limits of the initial redevelopment parcel. The locations of monitoring well MW-115 and the four new temporary piezometers in the monitoring well MW-115 area, piezometers W115-GW01 through W115-GW04, as well as summary analytical results are presented on Figures 8 and 9 and in Appendix C.

Work Plan Objective: During the Phase I investigation, LNAPL was identified in monitoring well MW-115; however, the source of this LNAPL was unknown. Fingerprint analysis was comparable to kerosene or jet fuel. The Work Plan objective was to determine the extent of LNAPL observed in monitoring well MW-115 during the Phase I investigation, and associated groundwater impacts. Four temporary piezometers were installed in the area of monitoring well MW-115. A groundwater sample was collected from each temporary piezometer and analyzed for Target Compound List (TCL) VOCs, TCL SVOCs, Target Analyte List (TAL) metals (total and dissolved) plus mercury, and TCL pesticides.

Results: LNAPL was not observed in any of the temporary piezometers (W115-GW-01, GW-02, GW-03 or GW-04) during the sampling event on January 2 and January 3, 2007. During the March 8, 2007 water level monitoring event, LNAPL was measured in monitoring well MW-115 at a thickness of 0.4 foot.

Sample analytical data indicate that groundwater quality in the monitoring well MW-115 area is impacted at low levels. Benzene was detected at concentrations exceeding its maximum contaminant level (MCL) in two of the temporary piezometers (less than 8 micrograms per liter [µg/l]) and chloroform, 1,2-dichloroethane (1,2-DCA), and 1,2-dichloropropane (1,2-DCP) were detected at concentrations exceeding USEPA Region III Tap Water RBCs, but not their respective MCLs. Trace (i.e., less than 1 µg/l) levels of alpha- and beta-BHC were detected and exceed

USEPA Region III Tap Water RBCs. gamma-BHC (7.3 µg/l) exceeded both its MCL and RBC at piezometer W115-GW04. Dissolved arsenic (up to 238 µg/l), dissolved thallium (18.3 µg/l), and dissolved cadmium (22.4 µg/l) also were detected at concentrations exceeding their respective MCLs. A summary of the analytical results for groundwater samples from the four temporary piezometers are presented on Figures 8 and 9, and in Appendix C. In addition, results are tabulated in the RFI Phase II Report Tables 3-1 through 3-5.

The non-detection of LNAPL using an interface probe lowered into each piezometer, and the absence of sheen or product in the purge and development water, suggests that the LNAPL is limited in extent to immediately near to monitoring well MW-115. Similarly, the groundwater impacts appear to be localized and limited in extent in this area. Therefore, no additional monitoring wells are recommended at this time.

3.2.2 Monitoring Well MW-112 Area

Monitoring well MW-112 is located in the northwest corner of the South Plant outside the limits of the initial redevelopment parcel. Three of four proposed groundwater samples (W112-HP01 through W112-HP03) in the area of monitoring well MW-112 were collected via a Hydropunch® sampler. The sample locations, including the location of W112-HP04 and summary analytical results are presented on Figures 8 and 9, in Appendix C, and are tabulated in the RFI Phase II Report.

Work Plan Objective: Phase I sampling of monitoring well MW-112 identified benzene, toluene, ethylbenzene and xylenes (BTEX compounds) in groundwater. The Work Plan objective of the Hydropunch® samples was to attempt to delineate the elevated concentrations of VOCs reported in monitoring well MW-112 during the Phase I investigation. The groundwater samples were analyzed for TCL VOCs, TCL SVOCs, TAL metals (total and dissolved) plus mercury, and TCL pesticides.

Results: VOCs were delineated north to Philadelphia Pike, to the south, and to the east.

Trichloroethene (TCE) and tetrachloroethene (PCE) were detected at concentrations of 75 µg/l and 10 µg/l, respectively, which exceed the respective MCLs for TCE and PCE of 5 µg/l at W112-HP01 located along Philadelphia Pike. Benzene, chloroform, 1,2-DCA, TCE, PCE, 1,2-DBA, and 1,4-DCB were detected at concentrations exceeding USEPA Region III Tap Water RBCs, but not the respective MCLs at all of the W112 sampling locations. Trace (i.e., less than 1 µg/l) levels of 4,4'-DDT, dieldrin, alpha- , and beta-BHC exceeding the corresponding USEPA Region III Tap Water RBCs were detected at two W112 sample locations. Dissolved arsenic was detected at a concentration of 46.6 µg/l above the MCL for arsenic of 10 µg/l at one of the W112 locations. The BTEX compounds detected in monitoring well MW-112 during the Phase I were detected at relatively low concentrations or were non-detect in the Hydropunch® samples. The analytical results from the W112 samples are presented on Figures 8 and 9 in Appendix C, and are tabulated in the RFI Phase II Report.

Based on the results of groundwater samples in the monitoring well MW-112 area, the chlorinated solvents observed in groundwater appear to be localized in the area of the maintenance building / welding shop and limited in extent.

3.2.3 Monitoring Well MW-106 Area

Monitoring well MW-106 is located in the northern portion of the South Plant just to the north of existing rail corridor. A Hydropunch® sampler was used to collect four groundwater samples (W106-HP01 through W106-HP04) located near monitoring well MW-106. The sample locations and summary analytical results are presented on Figures 8 and 9, in Appendix C, and are tabulated in the RFI Phase II Report. The groundwater samples were analyzed for TCL VOCs, TCL SVOCs, TAL metals (dissolved and total) plus mercury, and TCL pesticides.

Work Plan Objective: Phase I groundwater sampling in monitoring well MW-106 identified high concentrations of chlorinated solvents, primarily PCE. The Work Plan objective of the Hydropunch® samples was to attempt to determine the extent of the elevated concentrations of VOCs detected in monitoring well MW-106 during the Phase I investigation.

Results: No VOCs were detected at concentrations exceeding their respective MCLs at any of the four W106 Hydropunch® sample locations. At W106-HP01, *cis*-1,2-dichloroethene (DCE) was detected at a concentration exceeding its USEPA Region III Tap Water RBC. Dissolved arsenic was detected at concentrations of 79,100 µg/l and 66,400 µg/l at locations W106-HP02 and W106-HP03, respectively, which exceed the MCL and USEPA Region III Tap Water for arsenic. *cis*-1,2-DCE was the only chlorinated VOC detected during the Phase I sampling activities in monitoring well MW-106 and was also detected in the W106 Hydropunch® samples. The analytical results from the W106 samples are presented on Figures 8 and 9, in Appendix C, and tabulated in the RFI Phase II Report.

Based on the results of groundwater samples in the monitoring well MW-106 area, with the exception of arsenic, the groundwater impacts observed appear to be localized in the area of monitoring well MW-106 and limited in extent.

3.2.4 Monitoring Well SAL-3 Area

Monitoring well SAL-3 is located in the northern portion of the South Plant toward the western boundary of the South Plant outside the limits of the initial redevelopment parcel. A Hydropunch® sampler was used to collect three of the five groundwater samples (SAL3-HP01 through SAL3-HP05) at the locations near monitoring well SAL-3 proposed in the Phase II Work Plan. The sample locations and summary analytical results are presented on Figures 8 and 9, in Appendix C, and tabulated in the RFI Phase II Report. Samples were not collected as planned from the SAL3-HP01 and SAL3-HP05 locations due to insufficient groundwater yield. The other three borings were relocated from their planned locations due to subsurface refusal. The groundwater samples were analyzed for TCL VOCs plus acetonitrile, TCL SVOCs plus acetophenone and pyridine, TAL metals (total and dissolved) plus mercury, and TCL pesticides.

Work Plan Objective: Phase I sampling at monitoring well SAL-3 identified acetone and methyl ethyl ketone in groundwater at relatively high concentrations. The Work Plan objective of the Hydropunch® samples was to attempt to delineate the extent of the elevated VOC concentrations reported in groundwater at monitoring well SAL-3.

Results: Benzene and 1,2-DCP were detected at SAL3-HP02 at concentrations of 11 µg/l and 16 µg/l, respectively, which exceed the corresponding MCLs for benzene and 1,2-DCP. Chloroform, benzene, and methyl tertiary butyl ether were also detected in groundwater in the SAL-3 area at concentrations exceeding their respective USEPA Region III Tap Water RBCs, but below their respective MCLs. The SVOC pyridine was detected at a concentration that exceeded its USEPA Region III Tap Water RBC, but below its MCL. Generally, trace (i.e., less than 1 µg/l) concentrations of pesticides 4,4 DDT, heptachlor epoxide, alpha-BHC, and beta-BHC were detected, exceeding their respective USEPA Region III Tap Water RBCs at three sampling locations. In addition, dissolved arsenic (at concentrations up to 770 µg/l), dissolved thallium (at a concentration of 21.9 µg/l), and dissolved cadmium (at a concentration of 19.6 µg/l) were detected at levels above their respective MCLs. The analytical results of the groundwater samples from the monitoring well SAL-3 area are presented on Figures 8 and 9, in Appendix C, and tabulated in the RFI Phase II Report.

Based on the results of groundwater samples in the monitoring well SAL-3 area, the groundwater impacts observed appear to be localized in the area of monitoring well SAL-3 and limited in extent.

3.2.5 Monitoring Well MW-114 Area

Monitoring well MW-114 is located in the northern portion of the South Plant adjacent to the existing rail corridor. A Hydropunch® sampler was used to collect one (W114-HP01) of the two groundwater samples at the locations near monitoring well MW-114 proposed in the Phase II Work Plan. The sample locations and analytical results are presented on Figures 8 and 9, in Appendix C, and tabulated in the RFI Phase II Report. A groundwater sample could not be

collected from W114-HP02 due to insufficient groundwater yield. The groundwater samples were analyzed for TCL VOCs, TCL SVOCs, TAL metals (dissolved and total) plus mercury, and TCL pesticides.

Work Plan Objective: The Phase I sampling at monitoring well MW-114 identified relatively high concentrations of benzene. The Work Plan objective of the Hydropunch® samples was to attempt to delineate the extent of the elevated VOCs reported in groundwater at monitoring well MW-114.

Results: Benzene was detected at a concentration exceeding its USEPA Region III Tap Water RBC, but no other VOCs were detected at concentrations exceeding their respective MCLs. Trace (i.e., less than 1 µg/l) levels of dieldrin, alpha-BHC and beta-BHC were also detected at concentrations exceeding their respective USEPA Region III Tap Water RBCs. Arsenic was detected at a concentration of 23 µg/l exceeding its MCL. The analytical results of the groundwater samples from the monitoring well MW-114 area are presented on Figures 8 and 9, in Appendix C, and tabulated in the RFI Phase II Report.

3.2.6 SWMU 1 Area

The SWMU 1 area is located in the southern portion of the initial redevelopment parcel. A Hydropunch® sampler was used to collect two groundwater samples at SWMU 1. The sampling locations and summary analytical results are presented on Figures 8 and 9, in Appendix C, and tabulated in the RFI Phase II Report. The groundwater samples were analyzed for TAL metals (dissolved and total) plus mercury.

Work Plan Objective: Groundwater quality at SWMU 1 was not evaluated during the Phase I RFI investigation activities. The Work Plan objective of these samples was to assess potential impacts from this unit on groundwater quality.

Results: Dissolved arsenic was detected in groundwater at SWMU 1 at a concentration of 9,050 µg/l which exceeds the MCL and the USEPA Region III Tap Water RBC for arsenic. No other dissolved metals were detected at concentrations exceeding either their MCL or USEPA Region III Tap Water RBC. The analytical results from groundwater samples collected at SWMU 1 are presented on Figures 8 and 9, in Appendix C, and tabulated in the RFI Phase II Report.

3.2.7 AOC 11 Area

AOC 11 is located in the northern portion of the South Plant outside the limits of the initial redevelopment parcel. One Hydropunch® sample was collected at AOC 11. The actual location was approximately 70 feet hydraulically downgradient and outside of the associated plant building containing the larger sump (the original Work Plan location) associated with this AOC. The sampling location and summary analytical results are shown on Figures 8 and 9, in Appendix C, and tabulated in the RFI Phase II Report. The boring was relocated due to safety concerns in the interior of the building. The groundwater sample was analyzed for TCL VOCs, TCL SVOCs, TAL metals (dissolved and total) plus mercury, and TCL pesticides.

Work Plan Objective: Groundwater quality at AOC 11 was not evaluated during the Phase I RFI investigation activities. The Work Plan objective of collecting the Hydropunch® sample was to assess impacts on groundwater quality from past use of the sump at AOC 11.

Results: No VOCs were detected at concentrations exceeding their respective MCLs at AOC 11. However, chloroform and benzene were detected at concentrations exceeding their respective USEPA Region III Tap Water RBCs. Concentrations of 4,4'-dichlorodiphenyldichloroethylene (DDE) (8.6 µg/l), 4,4'-dichlorodiphenyldichloroethane (DDD) (9.5 µg/l), 4,4'-DDT (54 µg/l), and alpha- ,beta-, and gamma-BHC (15 µg/l, 3 µg/l, and 1 µg/l, respectively) also exceeded their respective USEPA Region III Tap Water RBCs. In addition, dissolved arsenic (at a concentration of

124 µg/l), dissolved cadmium (at a concentration of 77 µg/l), dissolved chromium (at a concentration of 11,300 µg/l), dissolved nickel (at a concentration of 8,840 µg/l), dissolved vanadium (at a concentration of 5,390 µg/l), and dissolved zinc (at a concentration of 13,900 µg/l) were detected at levels exceeding their respective MCLs or USEPA Region III Tap Water RBCs (in the absence of corresponding MCLs). The analytical results from the groundwater samples collected in the area of AOC 11 are presented on Figures 8 and 9, in Appendix C, and tabulated in the RFI Phase II Report.

3.3 WATER LEVELS AND GROUNDWATER WATER FLOW

Groundwater flow direction in the northern half of the South Plant is generally to the south in the direction of the Delaware River as confirmed by the two Phase II water level measurement events of January and March 2007. In the initial redevelopment area of the South Plant, the groundwater flow direction turns more south-southwest to westerly, becoming more parallel to the flow of the Delaware River. Groundwater contour maps for both measurement events are presented in Appendix C.

3.4 FINDINGS

3.4.1 Groundwater Quality Findings

The presence of VOCs and SVOCs in groundwater at the South Plant appears to be localized and limited in extent. While certain VOCs and SVOCs were detected at concentrations exceeding corresponding MCLs or USEPA Region III Tap Water RBCs in limited locations, VOCs and SVOCs (to the extent detected) were generally found at low concentrations. Chlorinated solvents identified in the Phase II work appear to be locally limited to the extreme northwest corner of the South Plant in Hydropunch® samples. Chlorinated solvents were not identified in the Hydropunch® samples in the vicinity of monitoring well MW-106, although Phase I samples from monitoring well MW-106 had relatively high concentrations of chlorinated solvents (primarily PCE). Dichlorodiphenyl dichloroethylene (DDX) compounds were present at three scattered locations and generally detected at concentrations of less than 1 µg/l, although they were detected above 1 µg/l at AOC 11. BHC compounds were locally present at six locations investigated; however, BHC compounds generally were present at only trace levels (less than 1 µg/l). These compounds were detected at higher concentrations at AOC 11 and SWMU 3 (monitoring well MW-115).

Dissolved arsenic was detected at concentrations exceeding the MCL for arsenic, and is mapable over four general areas of the South Plant. These four areas (described below) are separated by areas where arsenic either was not detected or was detected at concentrations below the relevant USEPA Region III Tap Water RBC or MCL for arsenic:

- An area in the northwest corner of the South Plant outside the limits of the initial redevelopment parcel near Philadelphia Pike which is localized and limited in extent, with concentrations of arsenic at less than 50 µg/l in the vicinity of monitoring well MW-112.
- An area in the northern portion of the South Plant outside the limits of the initial redevelopment parcel that is limited in extent in the vicinity of AOC 7, AOC 10, AOC 11, and SAL-3 with concentrations of arsenic ranging up to over 700 µg/l.
- An area in the northern portion of the South Plant outside the limits of the initial redevelopment parcel that is localized and limited in extent in the vicinity of SWMU 3 (near monitoring well MW-115) with concentrations of arsenic ranging up over 230 µg/l.
- An area beneath the initial redevelopment parcel in the southern portion of the South Plant in the vicinity of SWMU 1 and SWMU 5. Concentrations of arsenic in groundwater in the vicinity of SWMU 5 range to over 79,000 µg/l. In the vicinity of SWMU 1, concentrations of arsenic in groundwater range to over 9,000 µg/l.

Dissolved metals other than arsenic detected in groundwater beneath the South Plant included the following:

- Dissolved cadmium, chromium, copper, lead, nickel, vanadium, and zinc were detected at concentrations exceeding their respective MCLs in groundwater at AOC 11 in the northern portion of the South Plant.
- Dissolved thallium and cadmium were detected in groundwater at concentrations exceeding their MCLs in the SAL-3 area and at SWMU 3 (near monitoring well MW-115) in the northern portions of the South Plant.
- Dissolved lead was detected at a concentration in excess of the MCL for lead at all four monitoring well MW-115 area locations (GW01 – 04), and one monitoring well MW-112 area location (02) in the northern portion of the South Plant.

While cadmium and thallium have been detected in groundwater at concentrations above the MCLs, the samples with such detections were obtained from locations where cadmium and thallium were either not detected or detected at concentrations below corresponding MCLs in surrounding locations. Based on these observations, the presence of cadmium and thallium in groundwater is believed to be limited in extent.

With the exception of dissolved arsenic, all of the detected compounds exceeding screening levels were found to be localized and limited in extent. No additional Hydropunch® borings or permanent monitoring well installations were recommended at the conclusion of the Phase II RFI activities. Dissolved arsenic was found in groundwater beneath several areas of the South Plant, including in groundwater near the Delaware River at the southern boundary of the South Plant.

3.4.2 2010 Pathway Investigation for Groundwater

Work Plan Objective: After submittal of the RFI Phase II Report, USEPA indicated that it believed that there were certain data gaps associated with groundwater quality at the South Plant and the potential impact of the groundwater migration pathway on surface water quality in the Delaware River. USEPA approved the use of selected wells as referenced in the Revised Work Plan submitted in 2010 for collection of groundwater quality samples to fill in data gaps needed to further assess the possible effects of the groundwater pathway upon surface water quality in the Delaware River. A total of seven monitoring wells located along the south perimeter of the South Plant and SWMU 9 (separately owned by Honeywell) were selected to be monitored.

Results: For this investigation, only pesticides, arsenic, and lead were analyzed. Arsenic and alpha-BHC were detected in six of the seven monitoring wells at concentrations exceeding screening criteria. The detected concentrations of alpha-BHC were only slightly elevated over the corresponding USEPA Region III Tap Water RBC in all but one sample. Beta-BHC and gamma-BHC were both detected at levels over their USEPA Region III Tap Water RBC in two samples. These results are summarized on Figures 8 and 9 and also in Table 3 of Appendix A. The average concentration of arsenic in groundwater disclosed by this investigation did not exceed the average of previous measurements considered by USEPA in assessing cross-media effects from groundwater to the Delaware River. This is reflected in the USEPA 2011 Environmental Indicators Determination, which concluded that migration of groundwater from the Delaware Valley Works was not creating unacceptable conditions in the Delaware River and that there were no unacceptable exposures to constituents in groundwater.

3.4.3 Additional Groundwater Sampling

On a separate but parallel path, Anchor QEA is preparing a work plan for additional groundwater fate and transport investigation on behalf of Honeywell that will be submitted to the USEPA and DNREC for approval.

4. SUMMARY OF ENVIRONMENTAL CONDITIONS AND CONCEPTUAL SITE MODEL

The investigations of soils and groundwater described in the previous sections of this report provide a substantial body of information regarding environmental conditions at the South Plant in general and the initial redevelopment parcel in particular. A conceptual site model for the initial redevelopment parcel is illustrated on Figure 10. A comprehensive summary of information regarding environmental conditions is as follows:

- As noted in Section 2 of the report, there are exceedances of screening criteria at a number of identified SWMUs and AOCs in surface and subsurface soils. Exceedances of screening criteria are not necessarily indicative of unacceptable risks.

- Many of the exceedances of screening criteria in soils appear to be localized and associated with the individual SWMUs and AOCs that were the subject of the RFI.

- Exceedances for some constituents in soils, most notably arsenic, are of greater significance in terms of both concentrations and distribution. There is an area of relatively substantial occurrence of arsenic in soils in and around SWMU 5 and a much smaller area with substantially elevated concentrations of arsenic at SWMUs 2, 6, 7, 8, 10, and 26 and AOCs 2 and 14. As discussed in Section 2.3, arsenic is believed to be primarily associated with historic fill. Based on the sample results from 2015 soil samples arsenic was also reported in soil samples from the western portion of the initial redevelopment parcel as well. Arsenic was often found to be co-located in soils with other constituents, most notably benzo(a)pyrene and lead.

- Overall groundwater flow was found to be in a southerly direction, toward the Delaware River.

- Exceedances of screening criteria in groundwater were identified for a number of constituents as noted in Section 3 of this report. The occurrence of most of these constituents was found to be localized.

- The occurrence of arsenic in groundwater was more extensive and widespread than other constituents, with exceedances of screening criteria occurring in multiple locations across the South Plant, including the initial redevelopment parcel.

- Possible cross-media migration (soils to groundwater) of arsenic is evident in the vicinity of SWMU 5. Multiple constituents exceed screening levels in soils in this area, but the coincident occurrence of arsenic in soils and dissolved arsenic in groundwater both near and downgradient of the SWMU 5 area is evident.

- The 2010 pathways investigation described in Sections 2 and 3 further evaluated possible stormwater-driven migration of constituents as particulates through the South Plant, and to a lesser extent, migration of dissolved constituents (most notably arsenic) in groundwater. The investigation provided important information on both of these potential pathways. This work confirmed that the presence of constituents as particulates transported via the stormwater system (sluiceway) was significant. The work also confirmed that dissolved arsenic was present in groundwater across portions of the South Plant.

- In 2011, USEPA assessed human exposures based on current site use and conditions (inactive operations), and concluded that the only current unacceptable condition was associated with potential food chain uptake from possible crabbing in the site vicinity in the Delaware River. USEPA noted that the occurrence of crabbing in this area had not been confirmed. The potential migration of dissolved phase arsenic in groundwater into the Delaware River was also explicitly considered, and was not found to result in unacceptable exposures in the Delaware River.

As noted earlier in this report, since 2012, investigations have focused on the near-shore sediment in the Delaware River, and the stormwater system that served as the particulate migration pathway for Delaware Valley Works-related constituents found in this near-shore river sediment. Two Interim Measures have been completed in this regard (cleanout of the stormwater systems for both the North and South Plants and remediation of the upper portion of the sluiceway through which these systems discharge to the Delaware River). Investigations and planning for an additional Interim Measure to cap both the lower sluiceway and the affected shoreline sediment are well underway. The extent of the shoreline river sediment cap will be determined in part by considering the results of the 2012 site-specific risk assessment for Delaware River sediment and the results of ongoing sampling and analysis.

Although the RFI has disclosed exceedances of screening levels for a number of constituents in other site media (Sections 2 and 3), site specific remediation criteria have not been developed through site specific risk assessments (except for near-shore river sediment) at this time because the presumptive remedy for the initial redevelopment parcel will eliminate direct contact pathways of exposure to such media.

The proposed presumptive remedy (an engineered low permeability cap) will mitigate all potential exposures to constituents beneath the capped area (initial redevelopment parcel, Tax Parcel ID 0607300002, as shown on Figures 2 and 11). The industrial redevelopment proposed for the initial redevelopment parcel includes low permeability capping that would isolate (contain) soils with exceedances of the screening criteria noted in the RFI (Section 2 of this report) and mitigate against potential cross-media migration from soils into groundwater. This constitutes a Presumptive Remedy for the initial redevelopment parcel (Tax Parcel ID 0607300002), as described in the March 2015 RCRA Toolbox document provided to Chemtrade and the redevelopment team by USEPA in April 2015.

5. SITE CONDITIONS ADDRESSED BY THE PRESUMPTIVE CAPPING REMEDY

Figure 11 shows the onshore portion of the initial redevelopment parcel (Tax Parcel ID 0607300002) as the "Area of Presumptive Redevelopment Capping Remedy". This area encompasses approximately 22 acres and contains the most substantial exceedances of soil and groundwater screening criteria at the South Plant identified during the RFI. The area proposed for redevelopment capping includes the following SWMUs and AOCs:

- SWMU 1
- SWMU 2
- SWMU 5
- SWMU 6
- SWMU 7
- SWMU 8
- SWMU 10
- SWMU 26
- SWMU 35
- SWMU 36
- AOC 2
- AOC 4
- AOC 14

5.1 ASSESSMENT OF POSSIBLE EXPOSURES TO SOILS INCLUDING DIRECT CONTACT, AIRBORN DUST TRANSPORT, AND STORMWATER TRANSPORT

The presumptive remedy includes an engineered barrier that would eliminate any uncontrolled future direct exposure to constituents associated with the foregoing SWMUs and AOCs (and nearby soils) and would also prevent any future migration by stormwater or airborne dust transport of these constituents.

The design of the engineered redevelopment cap will be integrated with the design of the balance of redevelopment. It is anticipated that the property will be developed with several commercial uses including a railroad yard that would provide for storage of feedstocks and products associated with energy-based industrial redevelopment of surrounding properties, and that future reuse of the land between the railroad yard and the pier would have additional related redevelopment operations, which operations may utilize the pier and the silos. These uses ae likely to require the construction of supporting commercial buildings. The Long-term Stewardship Plan (LTSP) and Contaminated Materials Management Plan (CMMP) (see Section 6.2) will ensure that any future structures(s) will maintain the integrity of the remedy.

5.2 ASSESSMENT OF POSSIBLE CROSS MEDIA MIGRATION OF ARSENIC DISSOLVED IN GROUNDWATER

To further assess possible cross-media migration of arsenic from soils to groundwater, and subsequently to the Delaware River, calculations (originally developed in 2004) were updated to assess concentrations of dissolved arsenic as measured in ten monitoring wells. The locations of these ten monitoring wells are along the cove area by AOCs 2 and 14 and SWMUs 2, 6, 7, 8, 10, and 26. The relevant water quality criteria are based on Title 7 Delaware Administrative Code 7401 § 4.5.9.3 Table 1 (setting forth water quality criteria for protection of aquatic life) administered by DNREC. The segment of the Delaware River adjacent to the initial redevelopment parcel is listed as Area 7 in the applicable regulations. Based on the designated uses for the Delaware River, which are listed as primary contact recreation, secondary contact recreation, and fish, aquatic life, and wildlife under Title 7 Delaware Administrative Code 7401 § 3, the water quality criteria for protection of human health (fish and water ingestion) are not applicable

because the designated uses for the Delaware River do not include use as a public water supply source. Accordingly, the relevant water quality standard for arsenic is the Fresh Chronic Criterion of 150 µg/l (found in Title 7 Delaware Administrative Code 7401 § 4.5.9.3, Table 1). Other parameters used in the calculations of potential cross-media migration of groundwater into the Delaware River are the contributing base flow of 700 feet along the Delaware River, a 15-foot saturated thickness of the water-bearing unit, and 3.7 feet per day (ft/day) for the average flow velocity for the water-bearing unit. While reviewing the calculations prepared in 2004, these values were also reviewed and found to be correct, so those values were used in the updated calculations.

The updated calculations use the average concentration of arsenic in groundwater based on the most recent sampling results for dissolved arsenic from each of the ten monitoring wells that were sampled adjacent to the Delaware River. The average concentration of arsenic in groundwater on this basis is 18.22 mg/l as described below.

Step 1 - Estimate the cross-sectional area (A_x) of the water bearing unit that contributes base flow to the Delaware River.

A_x= 700 ft x 15 ft

A_x=10,500 ft^2

Step 2 - Estimate the theoretical flow (Q_{gw}) of groundwater entering the Delaware River from this cross-sectional area.

Q_{gw}= (3.7 ft/day)(10,500 ft^2)/(86,400 sec/day)

Q_{gw}= 0.45 ft^3/sec

Step 3 - Determination of arsenic concentrations within the groundwater flow zone.

Monitoring wells MW-108 (28.6 J mg/l), MW-109 (3.82 J mg/l), MW-110 (1.54 mg/l), MW-111 (0.51 mg/l), B-1 (15.1 mg/l), B-2 (8.26 J mg/l), B-2D (49.6 mg/l), B-3 (29.9 mg/l), B-4 (19.4 mg/l), B-5 (25.5 mg/l) Total = 182.22 mg/l/10 = 18.22 mg/l

Step 4 - Determination of harmonic mean flow of the Delaware River adjacent to the South Plant.

The harmonic mean flow of the Delaware River at the nearest gauging station (West Trenton, New Jersey) is 6,120 ft^3/sec (as determined by USGS for the Pennsylvania Department of Environmental Protection). Because this gauging station is a relatively long distance (upstream) from the South Plant, harmonic mean flows for several tributaries between the Trenton gauging station and the South Plant were included to provide a more realistic harmonic flow adjacent to the South Plant. These tributaries contribute approximately an additional 1,184 ft^3/sec of flow to the Delaware River.

$Q_{harmonic\ mean}$= 6,120 ft^3/sec+ 1,184 ft^3/sec = 7,304 ft^3/sec

Step 5 - Calculation of theoretical in-river concentrations of arsenic from the diffuse discharge of groundwater from beneath the South Plant to the Delaware River.

$C_{sw}= C_{gw}*(Q_{gw}/Q_{harmonic\ mean})$

C_{sw}= 18.22 mg/l *(0.45 ft^3/sec / 7,304 ft^3/sec)

C_{sw}= 0.001123 mg/l x 1,000

C_{sw}= 1.1 µg/l

Therefore, the calculated concentrations of dissolved arsenic migrating to the Delaware River from the diffuse discharge of groundwater from beneath the South Plant will result in concentrations of arsenic in surface water that are two orders of magnitude below the relevant water quality standard of 150 µg/l.

Further assessment of the fate and transport of dissolved arsenic in groundwater is planned. The anticipated remedial objective for groundwater will prevent use of impacted groundwater and protect against unacceptable ecological exposures in Delaware River sediment porewater.

6. PROTECTIVENESS OF THE PROPOSED REDEVELOPMENT PRESUMPTIVE CAPPING REMEDY

The presumptive engineered redevelopment capping remedy will be designed to support the overlying rail yard. Additionally, the cap will serve as an engineered barrier to prevent direct contact with the underlying impacted soils and groundwater, and will prevent future erosion or impacted soil migration by stormwater. The cap will also be designed and constructed to prevent infiltration to mitigate potential cross-media migration (soil to groundwater) of arsenic.

The design of the engineered cap is in progress. The engineered cap will be designed to prevent exposures to the soils beneath it. Therefore, potential direct contact, water erosion and airborne dust migration exposure pathways will be eliminated, irrespective of the degree to which these soils are (or are not) impacted.

6.1 MITIGATION OF POTENTIAL CROSS-MEDIA MIGRATION

USEPA has expressed some concern regarding potential cross-media migration (soil to groundwater) of arsenic. The USEPA 2011 Environmental Indicators Determination did not indicate unacceptable exposures to arsenic in either soils or groundwater. . However, in an effort to facilitate expedited regulatory approval of the presumptive remedy, the site redevelopment team has committed to incorporate low permeability features into the engineered redevelopment cap over the entire (22-acre) initial redevelopment area. The area slated for low permeability capping is shown on Figure 11 and includes the following SWMUs and AOCs:

- SWMU 1
- SWMU 2
- SWMU 5
- SWMU 6
- SWMU 7
- SWMU 8
- SWMU 10
- SWMU 26
- SWMU 35
- SWMU 36
- AOC 2
- AOC 4
- AOC 14

The total area of the presumptive capping remedy as shown on Figure 11 is approximately 22 acres, with the entire area slated to include low permeability components. The design of the presumptive remedy (engineered redevelopment low permeability capping) is planned to be completed and submitted to USEPA and DNREC in the first quarter of 2016.

6.2 OVERALL ACHIEVEMENT OF PROTECTIVENESS

The redevelopment cap will serve as the engineered barrier of the presumptive remedy, and will be supplemented by institutional controls to assure protectiveness going forward. These institutional controls will be effectuated through recording of an environmental covenant in accordance with the Delaware Uniform Environmental Covenants Act for Tax Parcel ID 0607300002 that will include the following elements:

- Documentation of the as-built configuration and extent of the low permeability cap.
- Requirements for maintaining the remedy (e.g., no digging, drilling, excavation, grading, construction, earth moving, or any other land disturbing activities in capped areas without DNREC approval or unless otherwise authorized).
- Limitations on groundwater withdrawal in accordance with written approvals of DNREC.
- Submission of a long-term stewardship (LTS) plan for DNREC approval.
- Submission of a contaminated materials management plan (CMMP) for DNREC approval.
- Use restrictions (non-residential uses only) in the context of the Delaware Uniform Environmental Covenants Act.

The presumptive remedy for which a Statement of Basis is issued will fulfill all regulatory objectives for environmental protectiveness for the area beneath the engineered cap (Figure 11). The engineered cap, supplemented by the recording of an environmental covenant as described above, will provide for a protective expedited remedy for the initial redevelopment parcel identified on Figure 11, which includes the most highly impacted areas of the South Plant. It will also enable expedited industrial redevelopment of the initial redevelopment parcel, with the associated community economic benefits.

The RCRA Interim Measures that will address the lower portion of the sluiceway and shoreline river sediment will proceed along a parallel separate track. The expedited capping remedy will be designed and constructed in a manner not to interfere with those Interim Measures, nor to preclude their possible future designation as Final Corrective Measures. Additionally, the capping remedy to address soils and subsequent redevelopment will be designed not to interfere with future investigation or possible remediation of groundwater.

6.3 ATTAINMENT OF FINAL RCRA CORRECTIVE ACTION OBJECTIVES

There are three fundamental objectives for corrective action under RCRA:

1. Protect human health and the environment
2. Attain media cleanup objectives
3. Control the sources of releases

The presumptive remedy achieves the objectives listed above. The capping of the entire redevelopment area will eliminate all direct exposure pathways to soils from human and ecological receptors. The environmental covenant will assure the integrity of the cap, and protect against inappropriate land uses and disturbance of the cap. Based on the 2011 Environmental Indicators Determination, there were no unacceptable exposures to groundwater. The utilization of low permeability elements in the cap mitigates against potential future cross-media migration of arsenic into groundwater. To further address this potential pathway, the environmental covenant will formally prohibit uncontrolled use of groundwater, thereby eliminating future direct exposure potential to groundwater.

In lieu of developing media cleanup standards for specific constituents and determining the extent of their application, the presumptive remedy provides engineering and institutional controls for the entire redevelopment area, and does not leave any areas of the initial redevelopment parcel requiring further characterization or remediation.

The sources of releases that resulted in the presence of constituents in site media were discontinued long ago. The conditions at the South Plant represent residual concentrations in media that resulted from long discontinued operations. Additionally, potentially mobile impacted sediments have been removed from migration pathways under

the Interim Measures completed for the sewer system and the upper sluiceway. All past sources have been addressed, and the presumptive remedy addresses potential future exposure pathways.

Evaluation criteria for corrective measures under the RCRA corrective action program are assessed when multiple alternatives are considered for implementation. Those criteria include the following:

- Long-term effectiveness
- Toxicity, mobility and volume reduction
- Short-term effectiveness
- Implementability
- Cost

As the presumptive redevelopment remedy has been identified for consideration, the screening of other alternatives is not being undertaken. However, the presumptive remedy can be assessed in the context of these criteria as follows:

- *Long-term effectiveness.* The combination of engineering controls buttressed by institutional controls in the form of a protective environmental covenant recorded for the deed to the initial redevelopment parcel will be highly effective over the long term.

- *Toxicity, mobility and volume reduction.* The cap is an engineered barrier designed to mitigate the mobility of the constituents contained beneath it. The volume and mass of contaminants at exposure points are reduced by the presumptive remedy.

- *Short-term effectiveness.* The presumptive remedy ranks very high in short-term effectiveness, as it will address the entire initial redevelopment parcel (Figure 11) on an expedited basis without delays for further incremental characterization and assessment. The most highly impacted areas of the South Plant will be addressed quickly and effectively in the near term.

- *Implementability.* The presumptive remedy is readily implementable, and will be designed to be integrated with the future industrial redevelopment of the initial redevelopment parcel.

- *Cost.* The proposed approach is believed to be reasonably cost effective. The approach of capping the entire area, and adding low permeability elements to the cap over the entire footprint, will be expensive, but the positive trade-offs with short-term effectiveness and implementability appear to justify the proposed redevelopment remedy.

Other balancing criteria include community and state acceptance. The State of Delaware has provided informal review and comment throughout the RCRA corrective action process. The State has not indicated disagreement with the corrective measures that are proposed. Public comment will be formally solicited by USEPA after initial publication of the Statement of Basis. The completion of the corrective measures on an expedited basis, in conjunction with community economic benefits of the industrial redevelopment of the initial redevelopment parcel, are likely to be well received by the public.

Therefore, on behalf of Chemtrade and the redevelopment team, Chemtrade and the industrial redevelopment team respectfully request that USEPA proceed with development of a Statement of Basis for the presumptive soils remedy as described in this report.

TABLES

TABLE 1
RCRA CORRECTIVE ACTION MAJOR DOCUMENTS
CHEMTRADE, LLC
DELAWARE VALLEY WORKS SOUTH PLANT
CLAYMONT, DELAWARE

Document Title	Date
RCRA Facility Assessment	1986
USEPA Order	2000
RFI Work Plan	2002
Summary of Presentation Items	2003
RFI Phase II Work Plan	2005
RFI Phase II Report	2007
RFI Phase II Report Comment Response	2008
USEPA Sediment Sampling	2008
Pathway Evaluation Framework	2009
Revised Work Plan	2010
Sediment, Soil, and Groundwater Data Submittal	2010
Interim Remedial Measure Alternatives Assessment Sewers	2011
Documentation of Environmental Indicator Determination	2011
Interim Remedial Measure Alternatives Assessment, Upper Portion of Sluiceway	2012
Interim Remedial Measure Alternatives Assessment Closure Report	2013

TABLE 2
SUMMARY EXPOSURE PATHWAY EVALUATION TABLE
POTENTIAL HUMAN RECEPTORS (UNDER CURRENT CONDITIONS)
CHEMTRADE, LLC
DELAWARE VALLEY WORKS SOUTH PLANT
CLAYMONT, DELAWARE

Contaminated Media	Residents	Workers	Day Care	Construction	Food
Groundwater	No	No	No	No	No
Soil (surface e.g., <2 ft)	No	No	No	No	No
Surface Water	No	No	No	No	No
Sediment	No	No	No	No	Yes
Soil (subsurface e.g., >2 ft)	No	No	No	No	No

Source: U.S. Environmental Protection Agency, "Documentation of Environmental Indicator Determination," May 3, 2011.

TABLE 3
DISPOSITION OF SWMU'S AND AOC'S
CHEMTRADE, LLC
DELAWARE VALLEY WORKS SOUTH SECTOR SOUTH PLANT PARCEL ID 0607300002
CLAYMONT, DELAWARE

SWMU/AOC ID	NAME	INSPECTED	SOIL SAMPLING and ANALYSIS[3]	FATE
SWMU 1[1]	Former North Phosphoric Acid Pond	Yes	Yes	Engineered Low Permeability Cap and Protective Restrictive Covenant
SWMU 2[1]	South Phosphoric Acid Pond	Yes	No	Engineered Low Permeability Cap and Protective Restrictive Covenant
SWMU 5[1]	Former Spar Building Storage Area	Yes	Yes	Engineered Low Permeability Cap and Protective Restrictive Covenant
SWMU 6[1]	South Treatment Plant, Drum Storage	Yes	No	Engineered Low Permeability Cap and Protective Restrictive Covenant
SWMU 7[1]	Effluent Clarifier	Yes	No	Engineered Low Permeability Cap and Protective Restrictive Covenant
SWMU 8[1]	Effluent Clarifier	Yes	No	Engineered Low Permeability Cap and Protective Restrictive Covenant
SWMU 10[1]	South Waste Treatment Storage Pad	Yes	No	Engineered Low Permeability Cap and Protective Restrictive Covenant
SWMU 26[1]	South Waste Treatment Plant	Yes	No	Engineered Low Permeability Cap and Protective Restrictive Covenant
SWMU 35[2]	Former Hazardous Waste Storage Pad	Yes	Yes	Engineered Low Permeability Cap and Protective Restrictive Covenant
SWMU 36[2]	Former Debris Staging Area/Alum Plant Area	Yes	Yes	Engineered Cap and Protective Restrictive Covenant
AOC 2[1]	Acid Spill Area	Yes	No	Engineered Low Permeability Cap and Protective Restrictive Covenant
AOC 4[1]	Conrail Fuel Spill Area	Yes	Yes	Engineered Low Permeability Cap and Protective Restrictive Covenant
AOC 14[2]	Former Sulfuric Acid Storage Tank Area Sump	Yes	Yes	Engineered Low Permeability Cap and Protective Restrictive Covenant

TABLE 3
DISPOSITION OF SWMU'S AND AOC'S
CHEMTRADE, LLC
DELAWARE VALLEY WORKS SOUTH SECTOR SOUTH PLANT PARCEL ID 0607300002
CLAYMONT, DELAWARE

Notes:

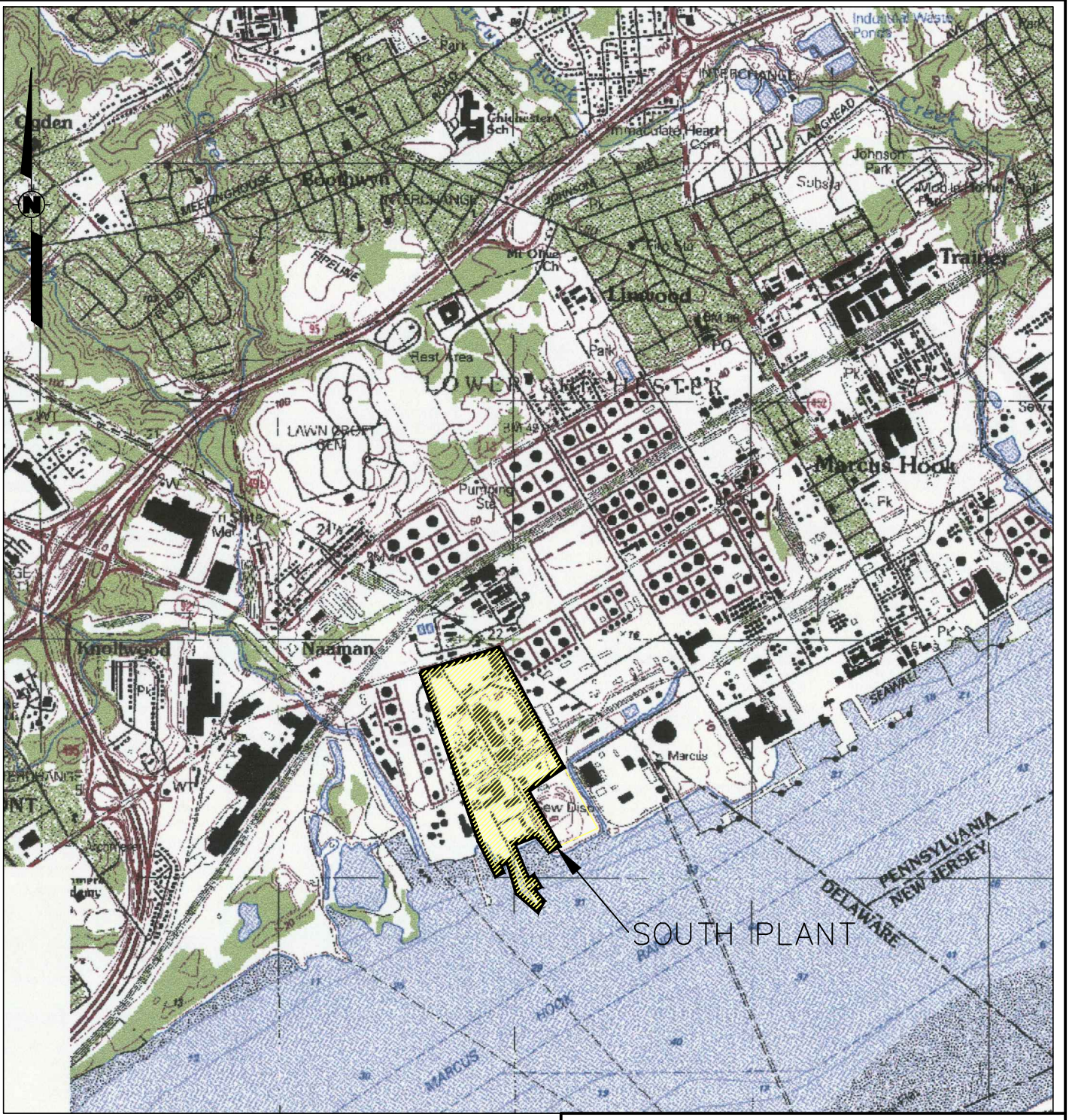
(1) Inspection documented in RFI Work Plan by Earth Sciences Consultants, Inc. and in Appendix C of RFI Summary and Presumptive Remedy for Proposed Industrial Redevelopment Area by Woodard & Curran.

(2) Inspection documented in RFI Phase II Report by Cummings/Riter Consultants, Inc. and MACTEC Engineering and Consulting, Inc.

(3) Sampling and analysis results summarized in RFI Summary and Presumptive Remedy for Proposed Industrial Redevelopment Area by Woodard & Curran.

FIGURES

DRAWING NUMBER 03360A8



SCALE

0 2000 4000 FEET

REFERENCE
USGS 7.5-MIN TOPOGRAPHIC QUADRANGLE
MARCUS HOOK, PA-NJ-DE, DATED 1993
SCALE 1:24000.

FIGURE 1

FACILITY LOCATION MAP

DELAWARE VALLEY WORKS (SOUTH PLANT)
CLAYMONT, DELAWARE

PREPARED FOR
CHEMTRADE LOGISTICS LLC
PARSIPPANY, NEW JERSEY

WOODARD &CURRAN
300 Penn Center Blvd.
Suite 800
Pittsburgh, PA 15235
(412) 241-4500
Fax: (412) 241-7500

DRAWING NUMBER 03360A8

REVISION	DATE	DESCRIPTION

DRAWN BY:	T.N. Fitzroy	DATE:	8-30-05
CHECKED BY:	R.C. Hendricks	DATE:	9-16-05
APPROVED BY:	R.C. Hendricks	DATE:	9-16-05

LEGEND

- APPROXIMATE PROPERTY BOUNDARY
- TOPOGRAPHIC CONTOURS
- RFI PHASE I SOLID WASTE MANAGEMENT UNITS
- RFI PHASE II SOLID WASTE MANAGEMENT UNITS
- RFI PHASE I AREA OF CONCERN (AOC)
- RFI PHASE II AREA OF CONCERN (AOC)
- AREA OF PRESUMPTIVE REDEVELOPMENT CAPPING REMEDY (POSSIBLY COMPLETED IN PHASES)

NOTES

1. FACILITY GRID IS BASED ON DELAWARE STATE PLANE MERIDIAN, NAD 27.
2. SWMUs AND AOCs ARE ONLY SHOWN THAT ARE RELEVENT TO THE SOUTH PLANT.

SOLID WASTE MANAGEMENT UNITS (RFI PHASE I)

(1) FORMER NORTH PHOSPHORIC ACID POND
(2) SOUTH PHOSPHORIC ACID POND
(5) FORMER SPAR BUILDING STORAGE AREA
(6) SOUTH TREATMENT PLANT, DRUM STORAGE
(7) EFFLUENT CLARIFIER
(8) EFFLUENT CLARIFIER
(10) SOUTH WASTE TREATMENT STORAGE PAD
(26) SOUTH WASTE TREATMENT PLANT

SOLID WASTE MANAGEMENT UNITS (RFI PHASE II)

(35) FORMER HAZARDOUS WASTE STORAGE PAD
(36) FORMER ALUM PLANT AREA/DEBRIS STAGING AREA

AREAS OF CONCERN (RFI PHASE I)

AOC 2 – ACID SPILL AREA
AOC 4 – CONRAIL FUEL SPILL AREA

AREAS OF CONCERN (RFI PHASE II)

AOC 14 – FORMER SULFURIC ACID STORAGE TANK AREA SUMP

REFERENCES:

1. EARTH SCIENCE CONSULTANTS, INC., DRAWING NO. 5455415.
2. APPROXIMATE LOW WATER LINE IS REFERENCED FROM VANDEMARK & LYNCH, INC., FIGURE "2.09C 1986.08.30 ALLIED CORP MINOR SUBDIVISION PLAN DRAWING 3 OF 3".

SCALE
100 0 100 200 FEET

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DESIGNED BY: R.E. JONES	CHECKED BY: P.F. O'HARA	
DRAWN BY: D.J. MARTINO	I:\360_DTO_JSP-2.dwg	

SITE PLAN

DELAWARE VALLEY WORKS
(SOUTH PLANT)
CLAYMONT, DELAWARE

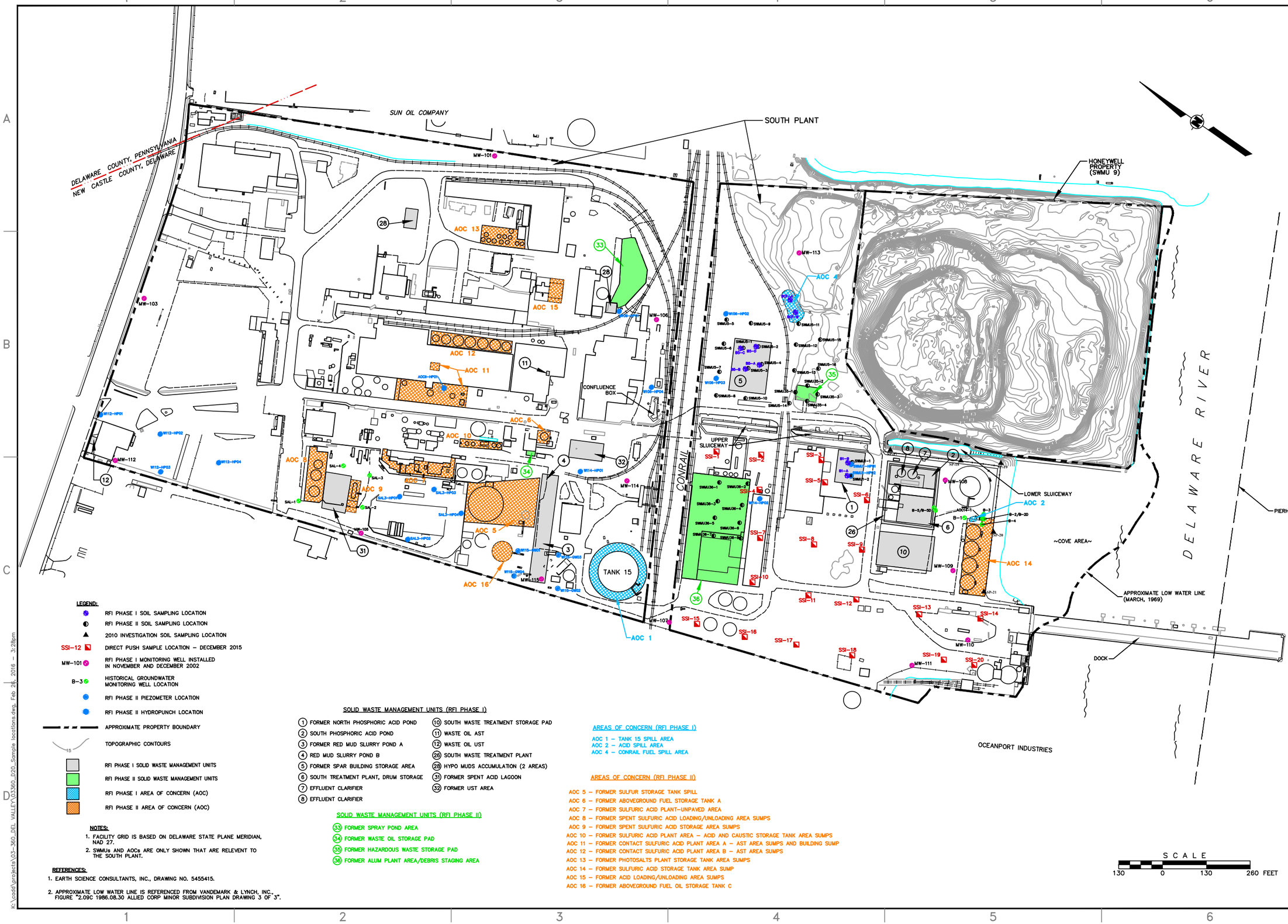
CHEMTRADE LOGISTICS LLC
PARSIPPANY, NEW JERSEY

JOB NO.:	03-360
DATE:	06-23-15
SCALE:	SHOWN
SHEET:	OF

FIGURE 2

K:\cad\projects\03-360_DEL VALLEY\03360_D10_FIG-2.dwg, Feb 23, 2016 - 2:52pm

22x34 SHEET
1:2.02



LEGEND:

- RFI PHASE I SOIL SAMPLING LOCATION
- RFI PHASE II SOIL SAMPLING LOCATION
- 2010 INVESTIGATION SOIL SAMPLING LOCATION
- SSI–12 — DIRECT PUSH SAMPLE LOCATION – DECEMBER 2015
- MW–101 — RFI PHASE I MONITORING WELL INSTALLED IN NOVEMBER AND DECEMBER 2002
- B–3 — HISTORICAL GROUNDWATER MONITORING WELL LOCATION
- RFI PHASE II PIEZOMETER LOCATION
- RFI PHASE II HYDROPUNCH LOCATION
- APPROXIMATE PROPERTY BOUNDARY
- TOPOGRAPHIC CONTOURS (15)
- RFI PHASE I SOLID WASTE MANAGEMENT UNITS
- RFI PHASE II SOLID WASTE MANAGEMENT UNITS
- RFI PHASE I AREA OF CONCERN (AOC)
- RFI PHASE II AREA OF CONCERN (AOC)

NOTES:

1. FACILITY GRID IS BASED ON DELAWARE STATE PLANE MERIDIAN, NAD 27.
2. SWMUs AND AOCs ARE ONLY SHOWN THAT ARE RELEVENT TO THE SOUTH PLANT.

REFERENCES:

1. EARTH SCIENCE CONSULTANTS, INC., DRAWING NO. 5455415.
2. APPROXIMATE LOW WATER LINE IS REFERENCED FROM VANDEMARK & LYNCH, INC., FIGURE "2.09C 1986.08.30 ALLIED CORP MINOR SUBDIVISION PLAN DRAWING 3 OF 3".

SOLID WASTE MANAGEMENT UNITS (RFI PHASE I)

1. FORMER NORTH PHOSPHORIC ACID POND
2. SOUTH PHOSPHORIC ACID POND
3. FORMER RED MUD SLURRY POND A
4. RED MUD SLURRY POND B
5. FORMER SPAR BUILDING STORAGE AREA
6. SOUTH TREATMENT PLANT, DRUM STORAGE
7. EFFLUENT CLARIFIER
8. EFFLUENT CLARIFIER
10. SOUTH WASTE TREATMENT STORAGE PAD
11. WASTE OIL AST
12. WASTE OIL UST
26. SOUTH WASTE TREATMENT PLANT
28. HYPO MUDS ACCUMULATION (2 AREAS)
31. FORMER SPENT ACID LAGOON
32. FORMER UST AREA

SOLID WASTE MANAGEMENT UNITS (RFI PHASE II)

33. FORMER SPRAY POND AREA
34. FORMER WASTE OIL STORAGE PAD
35. FORMER HAZARDOUS WASTE STORAGE PAD
36. FORMER ALUM PLANT AREA/DEBRIS STAGING AREA

AREAS OF CONCERN (RFI PHASE I)

AOC 1 – TANK 15 SPILL AREA
AOC 2 – ACID SPILL AREA
AOC 4 – CONRAIL FUEL SPILL AREA

AREAS OF CONCERN (RFI PHASE II)

AOC 5 – FORMER SULFUR STORAGE TANK SPILL
AOC 6 – FORMER ABOVEGROUND FUEL STORAGE TANK A
AOC 7 – FORMER SULFURIC ACID PLANT–UNPAVED AREA
AOC 8 – FORMER SPENT SULFURIC ACID LOADING/UNLOADING AREA SUMPS
AOC 9 – FORMER SPENT SULFURIC ACID STORAGE AREA SUMPS
AOC 10 – FORMER SULFURIC ACID PLANT AREA – ACID AND CAUSTIC STORAGE TANK AREA SUMPS
AOC 11 – FORMER CONTACT SULFURIC ACID PLANT AREA A – AST AREA SUMPS AND BUILDING SUMP
AOC 12 – FORMER CONTACT SULFURIC ACID PLANT AREA B – AST AREA SUMPS
AOC 13 – FORMER PHOTOSALTS PLANT STORAGE TANK AREA SUMPS
AOC 14 – FORMER SULFURIC ACID STORAGE TANK AREA SUMP
AOC 15 – FORMER ACID LOADING/UNLOADING AREA SUMPS
AOC 16 – FORMER ABOVEGROUND FUEL OIL STORAGE TANK C

SCALE
130 0 130 260 FEET

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REV	DESCRIPTION	DATE
	DESIGNED BY: R.E. JONES	CHECKED BY: P.F. O'HARA
	DRAWN BY: D.J. MARTINO	I:\3360.020_SAMPLE LOCATI.dwg

SAMPLE LOCATION MAP

DELAWARE VALLEY WORKS (SOUTH PLANT)
CLAYMONT, DELAWARE

CHEMTRADE LOGISTICS LLC
PARSIPPANY, NEW JERSEY

JOB NO.:	03–360
DATE:	06–23–15
SCALE:	SHOWN
SHEET:	OF

FIGURE 3

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LEGEND

- RFI PHASE I SOIL SAMPLING LOCATION
- RFI PHASE II SOIL SAMPLING LOCATION
- 2010 INVESTIGATION SOIL SAMPLING LOCATION
- 443/398/204 — THE SECOND AND THIRD RESULTS ARE FROM DEEPER SAMPLE DEPTHS
- 11.8(17.6) — DUPLICATE SAMPLE RESULT IS INDICATED IN PARENTHESES
- APPROXIMATE PROPERTY BOUNDARY
- TOPOGRAPHIC CONTOURS
- RFI PHASE I SOLID WASTE MANAGEMENT UNITS
- RFI PHASE II SOLID WASTE MANAGEMENT UNITS
- RFI PHASE I AREA OF CONCERN (AOC)
- RFI PHASE II AREA OF CONCERN (AOC)

NOTES:

1. FACILITY GRID IS BASED ON DELAWARE STATE PLANE MERIDIAN, NAD 27.
2. SOIL RESULTS ARE IN MILLIGRAMS PER KILOGRAM.
3. ALL SOIL SAMPLE ARSENIC RESULTS EXCEED BOTH THE USEPA REGION III SOIL SCREENING LEVEL FOR GROUNDWATER MIGRATION, DILUTION ATTENUATION FACTOR=20 (0.026 mg/kg); OR THE USEPA REGION III RISK-BASED CONCENTRATION FOR INDUSTRIAL SOIL (1.9 mg/kg).
4. "NA" INDICATES PARAMETER NOT ANALYZED
5. RESULTS ARE FROM SAMPLES TAKEN 0-6" BELOW GROUND SURFACE UNLESS OTHERWISE NOTED.
6. SWMUs AND AOCs ARE ONLY SHOWN THAT ARE RELEVENT TO THE SOUTH PLANT.
7. DATA FROM THE DECEMBER 2015 SAMPLING EVENT IS PRESENTED IN APPENDIX B.

SOLID WASTE MANAGEMENT UNITS (RFI PHASE I)

(1) FORMER NORTH PHOSPHORIC ACID POND
(2) SOUTH PHOSPHORIC ACID POND
(5) FORMER SPAR BUILDING STORAGE AREA
(6) SOUTH TREATMENT PLANT, DRUM STORAGE
(7) EFFLUENT CLARIFIER
(8) EFFLUENT CLARIFIER
(10) SOUTH WASTE TREATMENT STORAGE PAD
(26) SOUTH WASTE TREATMENT PLANT

SOLID WASTE MANAGEMENT UNITS (RFI PHASE II)

(35) FORMER HAZARDOUS WASTE STORAGE PAD
(36) FORMER ALUM PLANT AREA/DEBRIS STAGING AREA

AREAS OF CONCERN (RFI PHASE I)

AOC 2 – ACID SPILL AREA
AOC 4 – CONRAIL FUEL SPILL AREA

AREAS OF CONCERN (RFI PHASE II)

AOC 14 – FORMER SULFURIC ACID STORAGE TANK AREA SUMP

REFERENCES:

1. EARTH SCIENCE CONSULTANTS, INC., DRAWING NO. 5455415.
2. APPROXIMATE LOW WATER LINE IS REFERENCED FROM VANDEMARK & LYNCH, INC., FIGURE "2.09C 1986.08.30 ALLIED CORP MINOR SUBDIVISION PLAN DRAWING 3 OF 3".

SCALE
100 0 100 200 FEET

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	DESIGNED BY: R.E. JONES CHECKED BY: P.F. O'HARA	
	DRAWN BY: D.J. MARTINO I:\0360_D11_FIG-4_ARSENIC.dwg	

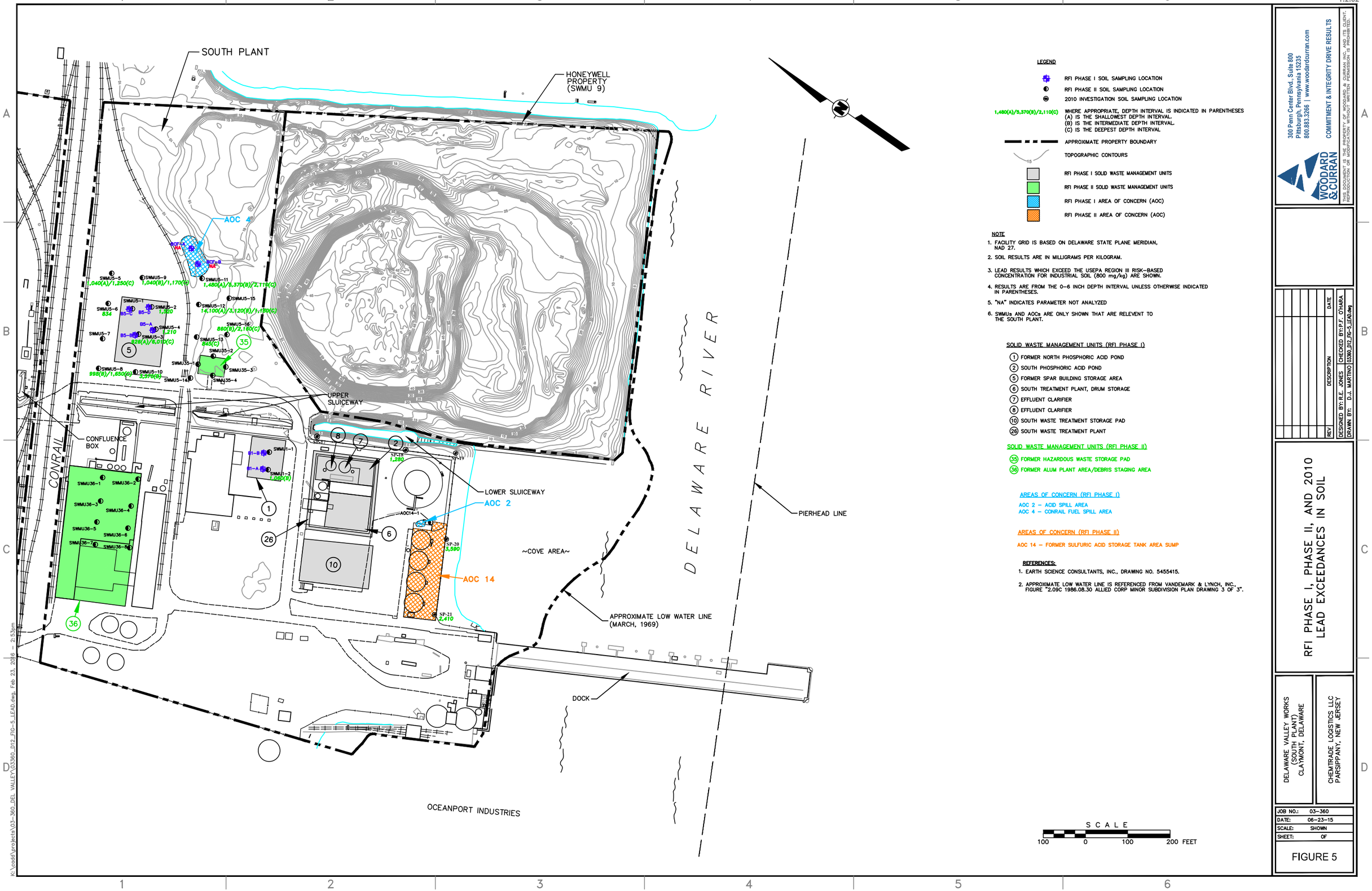
RFI PHASE I, PHASE II, AND 2010 ARSENIC EXCEEDANCES IN SOIL

DELAWARE VALLEY WORKS (SOUTH PLANT) CLAYMONT, DELAWARE

CHEMTRADE LOGISTICS LLC PARSIPPANY, NEW JERSEY

JOB NO.:	03-360
DATE:	06-23-15
SCALE:	SHOWN
SHEET:	OF

FIGURE 4



LEGEND

- RFI PHASE I SOIL SAMPLING LOCATION
- RFI PHASE II SOIL SAMPLING LOCATION
- 2010 INVESTIGATION SOIL SAMPLING LOCATION
- 1,480(A)/5,370(B)/2,110(C) — WHERE APPROPRIATE, DEPTH INTERVAL IS INDICATED IN PARENTHESES (A) IS THE SHALLOWEST DEPTH INTERVAL. (B) IS THE INTERMEDIATE DEPTH INTERVAL. (C) IS THE DEEPEST DEPTH INTERVAL
- APPROXIMATE PROPERTY BOUNDARY
- TOPOGRAPHIC CONTOURS
- RFI PHASE I SOLID WASTE MANAGEMENT UNITS
- RFI PHASE II SOLID WASTE MANAGEMENT UNITS
- RFI PHASE I AREA OF CONCERN (AOC)
- RFI PHASE II AREA OF CONCERN (AOC)

NOTE

1. FACILITY GRID IS BASED ON DELAWARE STATE PLANE MERIDIAN, NAD 27.
2. SOIL RESULTS ARE IN MILLIGRAMS PER KILOGRAM.
3. LEAD RESULTS WHICH EXCEED THE USEPA REGION III RISK-BASED CONCENTRATION FOR INDUSTRIAL SOIL (800 mg/kg) ARE SHOWN.
4. RESULTS ARE FROM THE 0-6 INCH DEPTH INTERVAL UNLESS OTHERWISE INDICATED IN PARENTHESES.
5. "NA" INDICATES PARAMETER NOT ANALYZED
6. SWMUs AND AOCs ARE ONLY SHOWN THAT ARE RELEVENT TO THE SOUTH PLANT.

SOLID WASTE MANAGEMENT UNITS (RFI PHASE I)

(1) FORMER NORTH PHOSPHORIC ACID POND
(2) SOUTH PHOSPHORIC ACID POND
(5) FORMER SPAR BUILDING STORAGE AREA
(6) SOUTH TREATMENT PLANT, DRUM STORAGE
(7) EFFLUENT CLARIFIER
(8) EFFLUENT CLARIFIER
(10) SOUTH WASTE TREATMENT STORAGE PAD
(26) SOUTH WASTE TREATMENT PLANT

SOLID WASTE MANAGEMENT UNITS (RFI PHASE II)

(35) FORMER HAZARDOUS WASTE STORAGE PAD
(36) FORMER ALUM PLANT AREA/DEBRIS STAGING AREA

AREAS OF CONCERN (RFI PHASE I)

AOC 2 – ACID SPILL AREA
AOC 4 – CONRAIL FUEL SPILL AREA

AREAS OF CONCERN (RFI PHASE II)

AOC 14 – FORMER SULFURIC ACID STORAGE TANK AREA SUMP

REFERENCES:

1. EARTH SCIENCE CONSULTANTS, INC., DRAWING NO. 5455415.
2. APPROXIMATE LOW WATER LINE IS REFERENCED FROM VANDEMARK & LYNCH, INC., FIGURE "2.09C 1986.08.30 ALLIED CORP MINOR SUBDIVISION PLAN DRAWING 3 OF 3".

SCALE
100 0 100 200 FEET

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REV	DESCRIPTION	DATE
	DESIGNED BY: R.E. JONES CHECKED BY: P.F. O'HARA	
	DRAWN BY: D.J. MARTINO I:\360_012_FIG-5_LEAD.mxd	

RFI PHASE I, PHASE II, AND 2010 LEAD EXCEEDANCES IN SOIL

DELAWARE VALLEY WORKS (SOUTH PLANT) CLAYMONT, DELAWARE

CHEMTRADE LOGISTICS LLC PARSIPPANY, NEW JERSEY

JOB NO.:	03-360
DATE:	06-23-15
SCALE:	SHOWN
SHEET:	OF

FIGURE 5

LEGEND

- RFI PHASE I SOIL SAMPLING LOCATION
- RFI PHASE II SOIL SAMPLING LOCATION
- 2010 INVESTIGATION SOIL SAMPLING LOCATION
- 630(A)/460(B)/3,100(C) DEPTH INTERVAL IS INDICATED IN PARENTHESES.
  (A) IS THE SHALLOWEST DEPTH INTERVAL.
  (B) IS THE INTERMEDIATE DEPTH INTERVAL.
  (C) IS THE DEEPEST DEPTH INTERVAL.
- APPROXIMATE PROPERTY BOUNDARY
- TOPOGRAPHIC CONTOURS
- RFI PHASE I SOLID WASTE MANAGEMENT UNITS
- RFI PHASE II SOLID WASTE MANAGEMENT UNITS
- RFI PHASE I AREA OF CONCERN (AOC)
- RFI PHASE II AREA OF CONCERN (AOC)

NOTE

1. FACILITY GRID IS BASED ON DELAWARE STATE PLANE MERIDIAN, NAD 27.
2. SOIL RESULTS ARE IN MICROGRAMS PER KILOGRAM
3. BENZO(a)PYRENE RESULTS WHICH EXCEED THE USEPA REGION III SOIL SCREENING LEVEL FOR GROUNDWATER MIGRATION, DILUTION ATTENUATION FACTOR=20 (120µg/kg) ARE SHOWN IN GREEN. RESULTS SHOWN IN RED ALSO EXCEED THE USEPA REGION III RISK BASED CONCENTRATION FOR INDUSTRIAL SOIL (390µg/kg).
4. RESULTS ARE FROM THE 0-6 INCH DEPTH INTERVAL UNLESS OTHERWISE INDICATED IN PARENTHESES.
5. "NA" INDICATES PARAMETER NOT ANALYZED
6. SWMUs AND AOCs ARE ONLY SHOWN THAT ARE RELEVENT TO THE SOUTH PLANT.

SOLID WASTE MANAGEMENT UNITS (RFI PHASE I)

(1) FORMER NORTH PHOSPHORIC ACID POND
(2) SOUTH PHOSPHORIC ACID POND
(5) FORMER SPAR BUILDING STORAGE AREA
(6) SOUTH TREATMENT PLANT, DRUM STORAGE
(7) EFFLUENT CLARIFIER
(8) EFFLUENT CLARIFIER
(10) SOUTH WASTE TREATMENT STORAGE PAD
(26) SOUTH WASTE TREATMENT PLANT

SOLID WASTE MANAGEMENT UNITS (RFI PHASE II)

(35) FORMER HAZARDOUS WASTE STORAGE PAD
(36) FORMER ALUM PLANT AREA/DEBRIS STAGING AREA

AREAS OF CONCERN (RFI PHASE I)

AOC 2 – ACID SPILL AREA
AOC 4 – CONRAIL FUEL SPILL AREA

AREAS OF CONCERN (RFI PHASE II)

AOC 14 – FORMER SULFURIC ACID STORAGE TANK AREA SUMP

REFERENCES:

1. EARTH SCIENCE CONSULTANTS, INC., DRAWING NO. 5455415.
2. APPROXIMATE LOW WATER LINE IS REFERENCED FROM VANDEMARK & LYNCH, INC., FIGURE "2.09C 1986.08.30 ALLIED CORP MINOR SUBDIVISION PLAN DRAWING 3 OF 3".

SCALE
100 0 100 200 FEET

WOODARD & CURRAN
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COMMITMENT & INTEGRITY DRIVE RESULTS

REV	DESCRIPTION	DATE
	DESIGNED BY: R.E. JONES CHECKED BY: P.F. O'HARA	
	DRAWN BY: D.J. MARTINO I:\360_013_FIG-6_BENZO.dwg	

RFI PHASE I, PHASE II, AND 2010 BENZO(a)PYRENE EXCEEDANCES IN SOIL

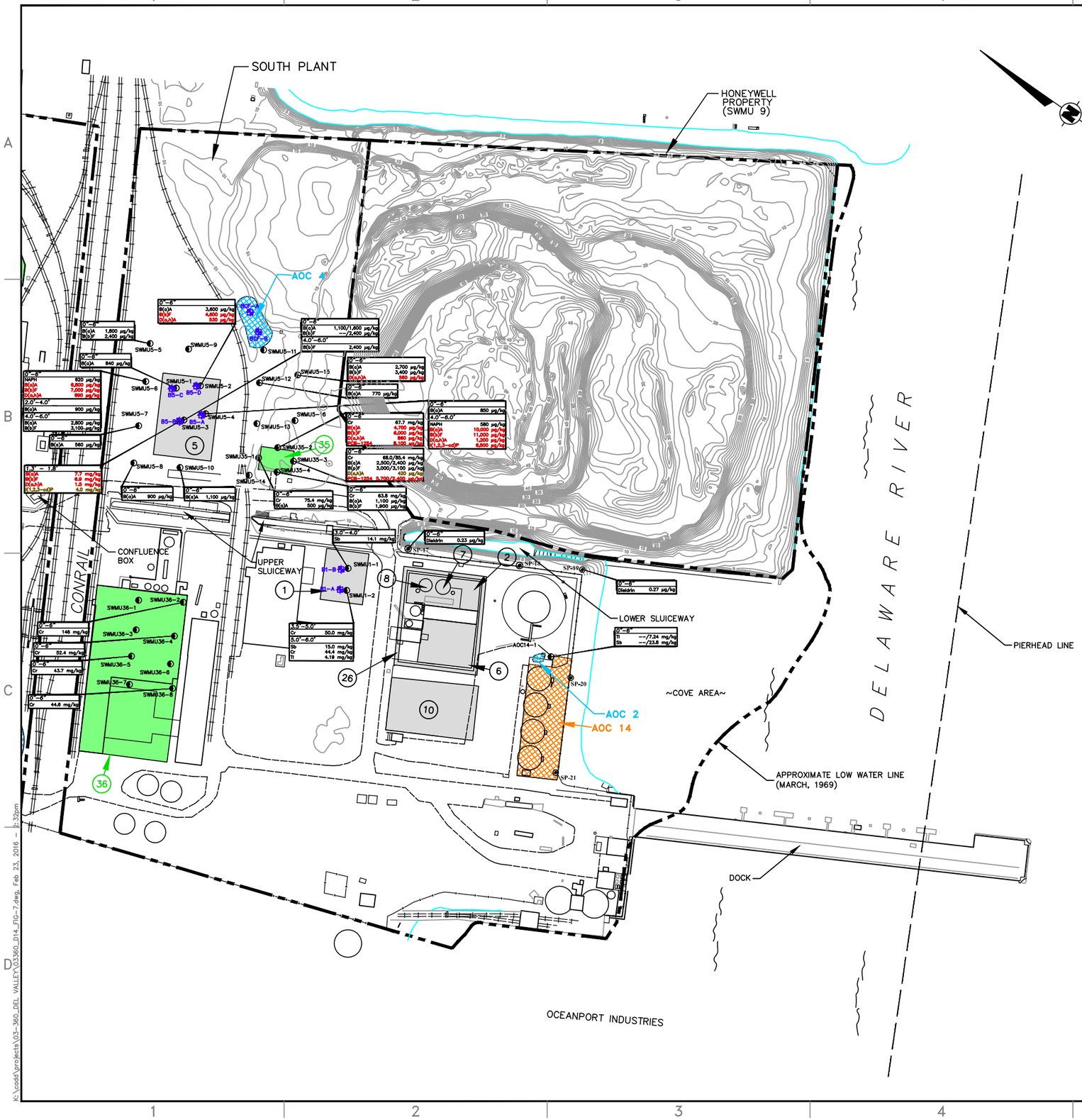
DELAWARE VALLEY WORKS (SOUTH PLANT)
CLAYMONT, DELAWARE

CHEMTRADE LOGISTICS LLC
PARSIPPANY, NEW JERSEY

JOB NO.:	03-360
DATE:	06-23-15
SCALE:	SHOWN
SHEET:	OF

FIGURE 6

K:\cadd\projects\03-360_DEL VALLEY\03360_013_FIG-6_BENZO.dwg, Feb 23, 2016 – 2:53pm



LEGEND

- RFI PHASE I SOIL SAMPLING LOCATION
- RFI PHASE II SOIL SAMPLING LOCATION
- 2010 INVESTIGATION SOIL SAMPLING LOCATION
- --/7.24 mg/kg — DUPLICATE SAMPLE RESULT IS INDICATED AFTER THE SLASH. "--" INDICATES ORIGINAL SAMPLE RESULT WAS NOT AN EXCEEDANCE.
- APPROXIMATE PROPERTY BOUNDARY
- TOPOGRAPHIC CONTOURS
- RFI PHASE I SOLID WASTE MANAGEMENT UNITS
- RFI PHASE II SOLID WASTE MANAGEMENT UNITS
- RFI PHASE I AREA OF CONCERN (AOC)
- RFI PHASE II AREA OF CONCERN (AOC)

NOTES

1. FACILITY GRID IS BASED ON DELAWARE STATE PLANE MERIDIAN, NAD 27.
2. RESULTS SHOWN IN BLACK EXCEED THE CORRESPONDING USEPA REGION III SOIL SCREENING LEVEL (SSL) FOR GROUNDWATER MIGRATION, DILUTION ATTENUATION FACTOR=20. RESULTS SHOWN IN BROWN EXCEED THE CORRESPONDING USEPA REGION III RISK-BASED CONCENTRATION (RBC) FOR INDUSTRIAL SOIL. RESULTS SHOWN IN RED EXCEED BOTH THE CORRESPONDING SSL AND RBC.
3. ABBREVIATIONS:
   Sb = ANTIMONY
   Cr = CHROMIUM
   Se = SELENIUM
   Tl = THALLIUM
   PCE = TETRACHLOROETHENE
   B(a)A = BENZO(a)ANTHRACENE 480/3900
   B(b)F = BENZO(b)FLUORANTHENE 1500/3900
   D(a,h)A = DIBENZ(a,h)ANTHRACENE 460/390
   I(1,2,3,-cd)P = INDENO(1,2,3,-cd)PYRENE 4200/3900
   1,4-DCB = 1,4-DICHLOROBENZENE 7.1/120,000
   NAPH = NAPHTHALENE
   Hg = MERCURY
4. SWMUs AND AOCs ARE ONLY SHOWN THAT ARE RELEVENT TO THE SOUTH PLANT.

SOLID WASTE MANAGEMENT UNITS (RFI PHASE I)

(1) FORMER NORTH PHOSPHORIC ACID POND
(2) SOUTH PHOSPHORIC ACID POND
(5) FORMER SPAR BUILDING STORAGE AREA
(6) SOUTH TREATMENT PLANT, DRUM STORAGE
(7) EFFLUENT CLARIFIER
(8) EFFLUENT CLARIFIER
(10) SOUTH WASTE TREATMENT STORAGE PAD
(26) SOUTH WASTE TREATMENT PLANT

SOLID WASTE MANAGEMENT UNITS (RFI PHASE II)

(35) FORMER HAZARDOUS WASTE STORAGE PAD
(36) FORMER ALUM PLANT AREA/DEBRIS STAGING AREA

AREAS OF CONCERN (RFI PHASE I)

AOC 2 – ACID SPILL AREA
AOC 4 – CONRAIL FUEL SPILL AREA

AREAS OF CONCERN (RFI PHASE II)

AOC 14 – FORMER SULFURIC ACID STORAGE TANK AREA SUMP

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SCALE
100 0 100 200 FEET

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COMMITMENT & INTEGRITY DRIVE RESULTS

REV	DESCRIPTION	DATE
	DESIGNED BY: R.E. JONES, CHECKED BY: P.F. O'HARA	
	DRAWN BY: D.J. MARTINO (J:\360_DEL_VALLEY\03360_014_FIG-7.dwg	

RFI PHASE I, PHASE II, AND 2010 EXCEEDANCES IN SOIL ADDITIONAL PARAMETERS

DELAWARE VALLEY WORKS (SOUTH PLANT) CLAYMONT, DELAWARE

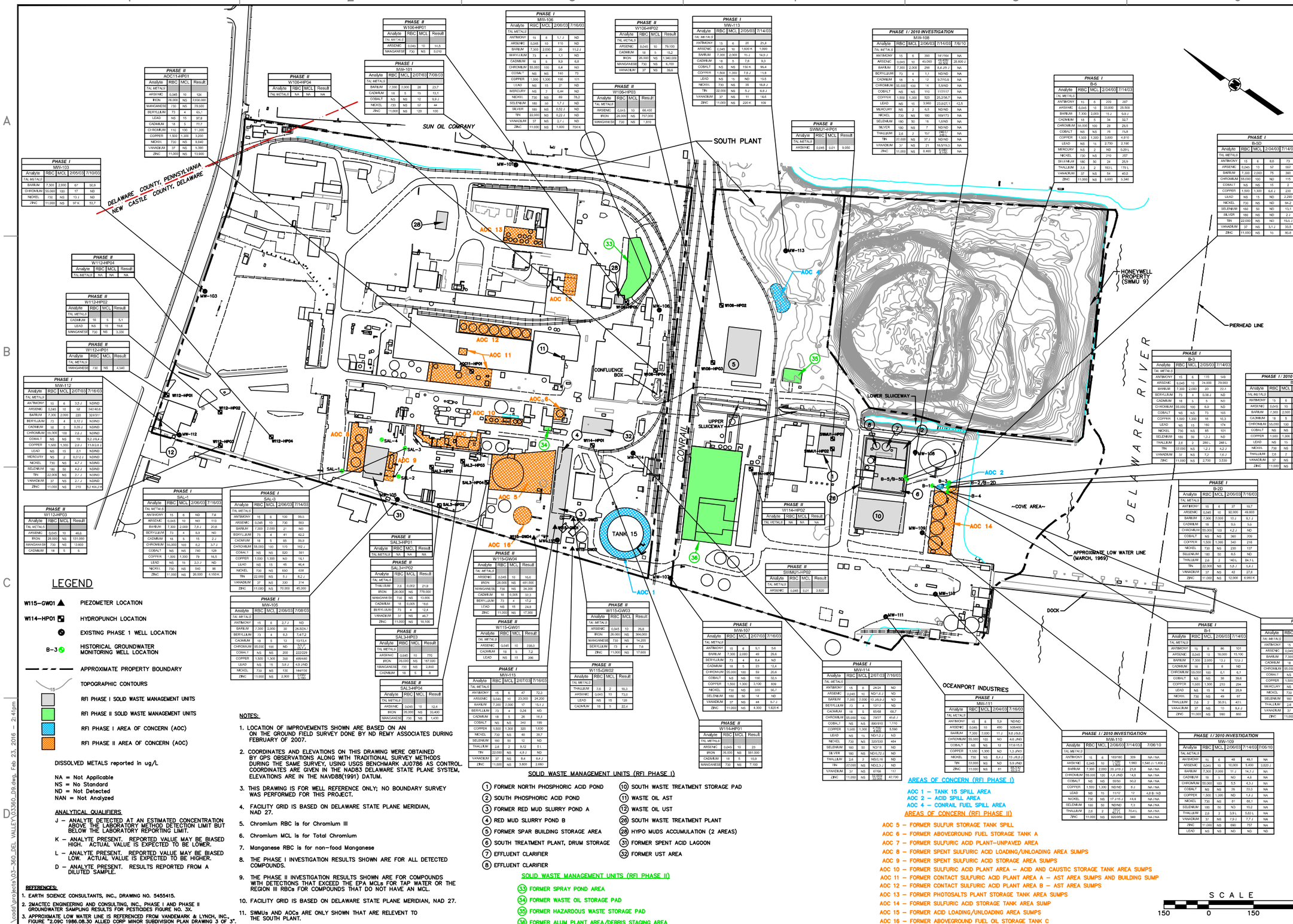
CHEMTRADE LOGISTICS LLC PARSIPPANY, NEW JERSEY

JOB NO.:	03-360
DATE:	06-23-15
SCALE:	SHOWN
SHEET:	OF

FIGURE 7

K:\cadd\projects\03-360_DEL_VALLEY\03360_014_FIG-7.dwg, Feb 23, 2016 - 2:32pm

22x34 SHEET
1:2.02



PHASE I
MW-103

Analyte	RBC	MCL	2/05/03	7/10/03
TAL METALS				
BARIUM	7,300	2,000	67	50.9
CHROMIUM	55,000	100	17	ND
NICKEL	730	NS	13 J	ND
ZINC	11,000	NS	97 K	53.7

PHASE II
AOC11-HP01

Analyte	RBC	MCL	Result
TAL METALS			
ARSENIC	0.045	10	124
IRON	26,000	NS	7,630,000
MANGANESE	730	NS	29,000
BERYLLIUM	73	4	65.1
LEAD	NS	15	97.8
CADMIUM	18	5	70.7
CHROMIUM	110	100	11,300
COPPER	1,500	1,300	3,200
NICKEL	730	NS	8,640
VANADIUM	37	NS	5,360
ZINC	11,000	NS	13,900

PHASE II
W106-HP04

Analyte	RBC	MCL	Result
TAL METALS	NA	NA	NA

PHASE I
MW-101

Analyte	RBC	MCL	2/07/03	7/08/03
TAL METALS				
BARIUM	7,300	2,000	28	23.7
CADMIUM	18	5	15	13.1
COBALT	NS	NS	12	8.8 J
NICKEL	730	NS	52	44
ZINC	11,000	NS	120	100

PHASE II
W106-HP01

Analyte	RBC	MCL	Result
TAL METALS			
ARSENIC	0.045	10	14.5
MANGANESE	730	NS	5,010

PHASE I
MW-106

Analyte	RBC	MCL	2/06/03	7/16/03
TAL METALS				
ANTIMONY	15	6	1.1 J	ND
ARSENIC	0.045	10	110	ND
BARIUM	7,300	2,000	20	11.2 J
BERYLLIUM	73	4	1.1	ND
CADMIUM	18	5	9.9	6.8
CHROMIUM	55,000	100	6.4	ND
COBALT	NS	NS	140	73
COPPER	1,500	1,300	190	121
LEAD	NS	15	21	ND
MERCURY	NS	2	0.44	ND
NICKEL	730	NS	89	78.2
SELENIUM	180	50	1.7 J	ND
SILVER	180	NS	0.52 J	ND
TIN	22,000	NS	9.22 J	ND
VANADIUM	37	NS	5.7 J	ND
ZINC	11,000	NS	1,600	764 K

PHASE II
W106-HP02

Analyte	RBC	MCL	Result
TAL METALS			
ARSENIC	0.045	10	79,100
CADMIUM	18	5	15.2
IRON	26,000	NS	13,340,000
MANGANESE	730	NS	6,700
VANADIUM	37	NS	99.6

PHASE II
W106-HP03

Analyte	RBC	MCL	Result
TAL METALS			
ARSENIC	0.045	10	66,400
IRON	26,000	NS	757,000
MANGANESE	730	NS	1,810

PHASE I
MW-113

Analyte	RBC	MCL	2/05/03	7/14/03
TAL METALS				
ANTIMONY	15	6	28	21.3
ARSENIC	0.045	10	1,000 K	1,000
BARIUM	7,300	2,000	10 J	14.9 J
CADMIUM	18	5	7.5	9.3
COBALT	NS	NS	150 K	96.4
COPPER	1,500	1,300	7.5 J	11.9
LEAD	NS	15	ND	10.5
NICKEL	730	NS	35	18.8 J
TIN	22,000	NS	5.2 J	6.9 J
VANADIUM	37	NS	11	14.6
ZINC	11,000	NS	220 K	109

PHASE I / 2010 INVESTIGATION
MW-108

Analyte	RBC	MCL	2/06/03	7/14/03	7/6/10
TAL METALS					
ANTIMONY	15	6	395	141/164	NA
ARSENIC	0.045	10	49,000	49,400 / 49,000	28,600 J
BARIUM	7,300	2,000	298	8.4 J / 9.2 J	NA
BERYLLIUM	73	4	1.3	ND/ND	NA
CADMIUM	18	5	12	9.7/10.8	NA
CHROMIUM	55,000	100	14	5.5/ND	NA
COBALT	NS	NS	110	117/117	NA
COPPER	1,500	1,300	525	25.2/36.7	NA
LEAD	NS	15	3,950	23.6/27.1	42.5
MERCURY	NS	2	6.5	ND/ND	NA
NICKEL	730	NS	160	99/173	NA
SELENIUM	180	50	16	1.5/ND	NA
SILVER	180	NS	7	ND/ND	NA
THALLIUM	2.6	2	10.7	2.8/3.1	NA
TIN	22,000	NS	37.1	ND/ND	NA
VANADIUM	37	NS	21	18.5/19.3	NA
ZINC	11,000	NS	8,490	3,150 / 3,150	NA

PHASE II
SWMU1-HP01

Analyte	RBC	MCL	Result
TAL METALS			
ARSENIC	0.045	0.01	9,550

PHASE I
B-5

Analyte	RBC	MCL	2/04/03	7/14/03
TAL METALS				
ANTIMONY	15	6	220	297
ARSENIC	0.045	10	33,600	25,500
BARIUM	7,300	2,000	19 J	9.9 J
CADMIUM	18	5	34	32.7
CHROMIUM	55,000	100	28	29.5
COBALT	NS	NS	76	75.8
COPPER	1,500	1,300	3,800	4,810
LEAD	NS	15	2,730	2,190
MERCURY	NS	2	ND	0.29 J
NICKEL	730	NS	210	257
SELENIUM	180	50	24	25.9
THALLIUM	2.6	2	183 L	179 L
VANADIUM	37	NS	54	45.8
ZINC	11,000	NS	5,600	5,340

PHASE I
B-5D

Analyte	RBC	MCL	2/04/03	7/14/03
TAL METALS				
ANTIMONY	15	6	8.6	7.3
ARSENIC	0.045	10	52	59.7
BARIUM	7,300	2,000	75	380
CHROMIUM	55,000	100	ND	11.5
COBALT	NS	NS	15	2
COPPER	1,500	1,300	6.6 J	2.09
LEAD	NS	15	ND	2.29
NICKEL	730	NS	ND	64.2
SELENIUM	180	50	ND	13.1
SILVER	180	NS	ND	2.1
TIN	22,000	NS	ND	19.5 J
VANADIUM	37	NS	5.1 J	33.5
ZINC	11,000	NS	70	80.8

PHASE I
B-3

Analyte	RBC	MCL	2/05/03	7/14/03
TAL METALS				
ANTIMONY	15	6	170	149
ARSENIC	0.045	10	74,000	29,900
BARIUM	7,300	2,000	20	22.1
BERYLLIUM	73	4	5.59 J	ND
CADMIUM	18	5	5	ND
CHROMIUM	55,000	100	6.9	ND
COBALT	NS	NS	73	165
COPPER	1,500	1,300	15	16.3
LEAD	NS	15	180	174
NICKEL	730	NS	85	101
SELENIUM	180	50	1.3 J	ND
THALLIUM	2.6	2	280 L	248 L
TIN	22,000	NS	1.2 J	4.2 J
VANADIUM	37	NS	7.2	7.6 J
ZINC	11,000	NS	2,700	3,530

PHASE I / 2010 INVESTIGATION
B-2

Analyte	RBC	MCL	2/05/03	7/16/03	7/06/10
TAL METALS					
ANTIMONY	15	6	87	87.1	NA
ARSENIC	0.045	10	11,000K	8,600	8,280 J
BARIUM	7,300	2,000	14 J	21.1	NA
CADMIUM	18	5	ND	2.8	NA
CHROMIUM	55,000	100	ND	10.1	NA
COBALT	NS	NS	43 K	40.8	NA
COPPER	1,500	1,300	46	76.8	NA
LEAD	NS	15	56	68.1	6.38 B
NICKEL	730	NS	61	56.5	NA
THALLIUM	2.6	2	14.5 L	16.0 L	NA
VANADIUM	37	NS	8.2 J	11	NA
ZINC	11,000	NS	1,300 K	1,020 K	NA

PHASE I
B-2D

Analyte	RBC	MCL	2/06/03	7/16/03
TAL METALS				
ANTIMONY	15	6	37	16.7
ARSENIC	0.045	10	92,000	49,800
BARIUM	7,300	2,000	19 J	8.7 J
CADMIUM	18	5	5.5	5.6
CHROMIUM	55,000	100	4.2 J	ND
COBALT	NS	NS	360	209
COPPER	1,500	1,300	340	218
NICKEL	730	NS	230	137
SELENIUM	180	50	8.5	ND
THALLIUM	2.6	2	14.1 L	8.4 L
TIN	22,000	NS	5.8 J	5.4 J
VANADIUM	37	NS	42	27.6
ZINC	11,000	NS	12,000	8,950 K

PHASE I
B-1

Analyte	RBC	MCL	2/06/03	7/14/03
TAL METALS				
ANTIMONY	15	6	86	101
ARSENIC	0.045	10	19,000	15,100
BARIUM	7,300	2,000	13 J	12.2 J
CADMIUM	18	5	6	4.8
CHROMIUM	55,000	100	5.1	5.1
COBALT	NS	NS	38	39.8
COPPER	1,500	1,300	210	204
LEAD	NS	15	14	28.9
NICKEL	730	NS	49	67
THALLIUM	2.6	2	30.3 L	42.1 L
VANADIUM	37	NS	10	8.4 J
ZINC	11,000	NS	990	860

PHASE I
B-4

Analyte	RBC	MCL	2/05/03	7/14/03
TAL METALS				
ANTIMONY	15	6	71	54.9
ARSENIC	0.045	10	3,800	19,400
BARIUM	7,300	2,000	6.3 J	36.9
CADMIUM	18	5	5.2 J	ND
CHROMIUM	55,000	100	6.35 J	ND
COBALT	NS	NS	5.7	25.6
COPPER	1,500	1,300	13	52.5
MERCURY	NS	2	0.001 J	ND
NICKEL	730	NS	14	30.8
SELENIUM	180	50	ND	6.6
THALLIUM	2.6	2	2.58 L	264 L
VANADIUM	37	NS	1.6 J	ND
ZINC	11,000	NS	160	673

PHASE I
MW-114

Analyte	RBC	MCL	2/07/03	7/16/03
TAL METALS				
ANTIMONY	15	6	24.24	ND
ARSENIC	0.045	10	ND F,J	ND
BARIUM	7,300	2,000	91.95 J	ND
BERYLLIUM	73	4	1.2 J	ND
CADMIUM	18	5	65.68	6.2
CHROMIUM	55,000	100	2907	45.6 J
COBALT	NS	NS	880/910	1,110
COPPER	1,500	1,300	2,400 / 2,500	5,590
LEAD	NS	15	ND F,J	ND
NICKEL	730	NS	320/330	484
SELENIUM	180	50	ND F,B	ND
SILVER	180	NS	ND H,T,J	ND
THALLIUM	2.6	2	ND L,T	ND
TIN	22,000	NS	ND H,T,J	ND
VANADIUM	37	NS	87.66	11.7
ZINC	11,000	NS	10,000 / 10,000	40,700

PHASE I
MW-107

Analyte	RBC	MCL	2/07/03	7/16/03
TAL METALS				
ANTIMONY	15	6	9.1	5.6
BARIUM	7,300	2,000	49	25.6
BERYLLIUM	73	4	8.4	ND
CADMIUM	18	5	23	12.4
CHROMIUM	55,000	100	59	20.6
COBALT	NS	NS	150	32.5
COPPER	1,500	1,300	3,100	839
NICKEL	730	NS	320	56.7
SELENIUM	180	50	14	ND
VANADIUM	37	NS	44	9.7 J
ZINC	11,000	NS	4,300	1,820 K

PHASE I
MW-111

Analyte	RBC	MCL	2/04/03	7/16/03
TAL METALS				
ANTIMONY	15	6	5.9 J	ND/ND
ARSENIC	0.045	10	890	508/490
BARIUM	7,300	2,000	11 J	9.8 J/9.5 J
CHROMIUM	55,000	100	ND	4.8 J/ND
COBALT	NS	NS	12	17.6/15.3
COPPER	1,500	1,300	7.2 J	5.2 J/ND
NICKEL	730	NS	8.4 J	13 J/9.2 J
TIN	22,000	NS	1.2 J	4.2 J
VANADIUM	37	NS	7.2	7.6 J
ZINC	11,000	NS	2,700	3,530

PHASE I / 2010 INVESTIGATION
MW-110

Analyte	RBC	MCL	2/06/03	7/14/03	7/06/10
TAL METALS					
ANTIMONY	15	6	160/180	309	NA / NA
ARSENIC	0.045	10	14,000	1,960	1,540 J / 1,400 J
BARIUM	7,300	2,000	20 J/19 J	21.8	NA / NA
CHROMIUM	55,000	100	5.4 J/ND	14.9	NA / NA
COBALT	NS	NS	59/56	90.2	NA / NA
COPPER	1,500	1,300	ND/ND	9.2	NA / NA
LEAD	NS	15	11/12	12	4.8 B / ND
NICKEL	730	NS	17 J/15 J	41.8	NA / NA
SELENIUM	180	50	ND/ND	7.3	NA / NA
THALLIUM	2.6	2	27 L/ 29 L	70.4 L	NA / NA
ZINC	11,000	NS	920/950	940	NA / NA

PHASE I / 2010 INVESTIGATION
MW-109

Analyte	RBC	MCL	2/06/03	7/14/03	7/06/10
TAL METALS					
ANTIMONY	15	6	48	48.1	NA
ARSENIC	0.045	10	10,000	5,400	3,820 J
BARIUM	7,300	2,000	11 J	14.1 J	NA
CADMIUM	18	5	ND	4.6	NA
CHROMIUM	55,000	100	5.5	4.3 J	NA
COBALT	NS	NS	29	22.3	NA
COPPER	1,500	1,300	ND	5.4 J	NA
NICKEL	730	NS	51	55.1	NA
SELENIUM	180	50	NO	15.2	NA
THALLIUM	2.6	2	3.9 L	5.83 L	NA
VANADIUM	37	NS	7.9 J	7.7 J	NA
ZINC	11,000	NS	690	767	NA
LEAD	NS	NS	ND	ND	ND

PHASE II
W112-HP03

Analyte	RBC	MCL	Result
TAL METALS			
ARSENIC	0.045	10	46.6
IRON	26,000	NS	131,000
MANGANESE	730	NS	13,600
CADMIUM	18	5	5

PHASE II
W112-HP04

Analyte	RBC	MCL	Result
TAL METALS	NA	NA	NA

PHASE II
W112-HP02

Analyte	RBC	MCL	Result
TAL METALS			
CADMIUM	18	5	5.3
LEAD	NS	15	19.6
MANGANESE	730	NS	3,330

PHASE II
W112-HP01

Analyte	RBC	MCL	Result
TAL METALS			
MANGANESE	730	NS	4,540

PHASE I
MW-112

Analyte	RBC	MCL	2/07/03	7/16/03
TAL METALS				
ANTIMONY	15	6	3.5 J	NDND
ARSENIC	0.045	10	52	142/40.6
BARIUM	7,300	2,000	220	32.9/31
BERYLLIUM	73	4	0.12 J	NDND
CADMIUM	18	5	0.35 J	NDND
CHROMIUM	55,000	100	2.8 J	NDND
COBALT	NS	NS	19	9.2 J/9.4 J
COPPER	1,500	1,300	2.9 J	11.9 J/2.4 J
LEAD	NS	15	2.1	NDND
MERCURY	NS	2	0.07 J	NDND
NICKEL	730	NS	4.7 J	NDND
SELENIUM	180	50	4.2 J	NDND
TIN	22,000	NS	2.1 J	NDND
VANADIUM	37	NS	2.1 J	NDND
ZINC	11,000	NS	210	53 J/43 J/9

PHASE I
SAL-1

Analyte	RBC	MCL	2/06/03	7/16/03
TAL METALS				
ANTIMONY	15	6	ND	7.6
ARSENIC	0.045	10	ND	11.3
BARIUM	7,300	2,000	7.8 J	21.8
BERYLLIUM	73	4	0.2 J	ND
CADMIUM	18	5	15	2.1
CHROMIUM	55,000	100	9.2	3.7 J
COBALT	NS	NS	740	128
COPPER	1,500	1,300	79	16.5
LEAD	NS	15	2.3 J	ND
NICKEL	730	NS	540	90
VANADIUM	37	NS	26.000	4.150 K

PHASE I
SAL-3

Analyte	RBC	MCL	2/06/03	7/14/03
TAL METALS				
ANTIMONY	15	6	100	55.5
ARSENIC	0.045	10	730	553
BARIUM	7,300	2,000	21	ND
BERYLLIUM	73	4	41	42.3
CADMIUM	18	5	65	55.9
CHROMIUM	55,000	100	170	162 J
COBALT	NS	NS	520	561
COPPER	1,500	1,300	140	114
LEAD	NS	15	45	46.4
NICKEL	730	NS	660	638
TIN	22,000	NS	5.2 J	8.2 J
VANADIUM	37	NS	330	314
ZINC	11,000	NS	70,000	45,300 J

PHASE I
MW-105

Analyte	RBC	MCL	2/06/03	7/08/03
TAL METALS				
ANTIMONY	15	6	2.7 J	ND
BARIUM	7,300	2,000	30	26.5J24.1
BERYLLIUM	73	4	0.3	1.4 J 7.2
CADMIUM	18	5	13	13/13.4
CHROMIUM	55,000	100	ND	12 J
COBALT	NS	NS	200	222/231
COPPER	1,500	1,300	1,900	499/481
LEAD	NS	15	3.6 J	4.9 J/ND
NICKEL	730	NS	130	144/156
ZINC	11,000	NS	2,900	3,180

PHASE II
SAL3-HP01

Analyte	RBC	MCL	Result
TAL METALS	NA	NA	NA

PHASE II
SAL3-HP02

Analyte	RBC	MCL	Result
TAL METALS			
THALLIUM	2.6	0.002	21.9
IRON	26,000	NS	779,000
MANGANESE	730	NS	13,500
CADMIUM	18	0.005	19.6
BERYLLIUM	73	4	12.4
VANADIUM	37	NS	46.7
ZINC	11,000	NS	18,100

PHASE II
SAL3-HP03

Analyte	RBC	MCL	Result
TAL METALS			
ARSENIC	0.045	10	770
IRON	26,000	NS	167,000
MANGANESE	730	NS	2,800
CADMIUM	18	5	8

PHASE II
SAL3-HP04

Analyte	RBC	MCL	Result
TAL METALS			
ARSENIC	0.045	10	12.4
IRON	26,000	NS	33,400
MANGANESE	730	NS	1,430

PHASE II
W115-GW04

Analyte	RBC	MCL	Result
TAL METALS			
ARSENIC	0.045	10	16.6
IRON	26,000	NS	681,000
MANGANESE	730	NS	34,300
CADMIUM	18	0.005	32.3
BERYLLIUM	73	4	17.2
LEAD	NS	15	24.8
ZINC	11,000	NS	17,300

PHASE II
W115-GW01

Analyte	RBC	MCL	Result
TAL METALS			
ARSENIC	0.045	10	235 J
CADMIUM	18	5	7.2
LEAD	NS	15	396

PHASE I
MW-115

Analyte	RBC	MCL	2/07/03	7/16/03
TAL METALS				
ANTIMONY	15	6	47	72.3
ARSENIC	0.045	10	23,000	24,200
BARIUM	7,300	2,000	17	15.1 J
BERYLLIUM	73	4	0.24	ND
CADMIUM	18	5	26	16.4
COBALT	NS	NS	240	199
COPPER	1,500	1,300	320	1,830
NICKEL	730	NS	46	39.7
SELENIUM	180	50	12	ND
THALLIUM	2.6	2	9.12	5.1
TIN	22,000	NS	4.8 J	ND
VANADIUM	37	NS	8.4	8.4 J
ZINC	11,000	NS	3,800	2,660

PHASE II
W115-GW02

Analyte	RBC	MCL	Result
TAL METALS			
THALLIUM	2.6	2	16.3
ARSENIC	0.045	10	73.9
LEAD	NS	15	128
CADMIUM	18	5	22.4

PHASE II
W115-GW03

Analyte	RBC	MCL	Result
TAL METALS			
ARSENIC	0.045	10	25.8
IRON	26,000	NS	364,000
MANGANESE	730	NS	14,200
BERYLLIUM	73	4	7.6
ZINC	11,000	NS	17,600

PHASE II
W114-HP01

Analyte	RBC	MCL	Result
TAL METALS			
ARSENIC	0.045	10	23
IRON	26,000	NS	581,000
MANGANESE	730	NS	7,100

PHASE II
W114-HP02

Analyte	RBC	MCL	Result
TAL METALS	NA	NA	NA

PHASE II
SWMU1-HP02

Analyte	RBC	MCL	Result
TAL METALS			
ARSENIC	0.045	0.01	3,820

LEGEND

- W115-GW01 ▲ — PIEZOMETER LOCATION
- W114-HP01 ■ — HYDROPUNCH LOCATION
- ⊙ — EXISTING PHASE 1 WELL LOCATION
- B-3 ⊙ — HISTORICAL GROUNDWATER MONITORING WELL LOCATION
- APPROXIMATE PROPERTY BOUNDARY
- 15 — TOPOGRAPHIC CONTOURS
- RFI PHASE I SOLID WASTE MANAGEMENT UNITS
- RFI PHASE II SOLID WASTE MANAGEMENT UNITS
- RFI PHASE I AREA OF CONCERN (AOC)
- RFI PHASE II AREA OF CONCERN (AOC)

DISSOLVED METALS reported in ug/L

NA = Not Applicable
NS = No Standard
ND = Not Detected
NAN = Not Analyzed

ANALYTICAL QUALIFIERS

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D – ANALYTE PRESENT. RESULTS REPORTED FROM A DILUTED SAMPLE.

REFERENCES:

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3. APPROXIMATE LOW WATER LINE IS REFERENCED FROM VANDEMARK & LYNCH, INC., FIGURE "2.09C 1986.08.30 ALLIED CORP MINOR SUBDIVISION PLAN DRAWING 3 OF 3".

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10. FACILITY GRID IS BASED ON DELAWARE STATE PLANE MERIDIAN, NAD 27.
11. SWMUs AND AOCs ARE ONLY SHOWN THAT ARE RELEVENT TO THE SOUTH PLANT.

SOLID WASTE MANAGEMENT UNITS (RFI PHASE I)

1. FORMER NORTH PHOSPHORIC ACID POND
2. SOUTH PHOSPHORIC ACID POND
3. FORMER RED MUD SLURRY POND A
4. RED MUD SLURRY POND B
5. FORMER SPAR BUILDING STORAGE AREA
6. SOUTH TREATMENT PLANT, DRUM STORAGE
7. EFFLUENT CLARIFIER
8. EFFLUENT CLARIFIER
10. SOUTH WASTE TREATMENT STORAGE PAD
11. WASTE OIL AST
12. WASTE OIL UST
26. SOUTH WASTE TREATMENT PLANT
28. HYPO MUDS ACCUMULATION (2 AREAS)
31. FORMER SPENT ACID LAGOON
32. FORMER UST AREA

SOLID WASTE MANAGEMENT UNITS (RFI PHASE II)

33. FORMER SPRAY POND AREA
34. FORMER WASTE OIL STORAGE PAD
35. FORMER HAZARDOUS WASTE STORAGE PAD
36. FORMER ALUM PLANT AREA/DEBRIS STAGING AREA

AREAS OF CONCERN (RFI PHASE I)

AOC 1 – TANK 15 SPILL AREA
AOC 2 – ACID SPILL AREA
AOC 4 – CONRAIL FUEL SPILL AREA

AREAS OF CONCERN (RFI PHASE II)

AOC 5 – FORMER SULFUR STORAGE TANK SPILL
AOC 6 – FORMER ABOVEGROUND FUEL STORAGE TANK A
AOC 7 – FORMER SULFURIC ACID PLANT–UNPAVED AREA
AOC 8 – FORMER SPENT SULFURIC ACID LOADING/UNLOADING AREA SUMPS
AOC 9 – FORMER SPENT SULFURIC ACID STORAGE AREA SUMPS
AOC 10 – FORMER SULFURIC ACID PLANT AREA – ACID AND CAUSTIC STORAGE TANK AREA SUMPS
AOC 11 – FORMER CONTACT SULFURIC ACID PLANT AREA A – AST AREA SUMPS AND BUILDING SUMP
AOC 12 – FORMER CONTACT SULFURIC ACID PLANT AREA B – AST AREA SUMPS
AOC 13 – FORMER PHOTOSALTS PLANT STORAGE TANK AREA SUMPS
AOC 14 – FORMER SULFURIC ACID STORAGE TANK AREA SUMP
AOC 15 – FORMER ACID LOADING/UNLOADING AREA SUMPS
AOC 16 – FORMER ABOVEGROUND FUEL OIL STORAGE TANK C

SCALE
150 0 150 300 FEET

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COMMITMENT & INTEGRITY DRIVE RESULTS

REV	DESCRIPTION	DATE

DESIGNED BY: R.E. JONES | CHECKED BY: P.F. O'HARA
DRAWN BY: D.J. MARTINO (03360_09.dwg)

RFI PHASE I, PHASE II , AND 2010 GROUNWATER SAMPLING RESULTS FOR TAL METALS

DELAWARE VALLEY WORKS (SOUTH PLANT)
CLAYMONT, DELAWARE

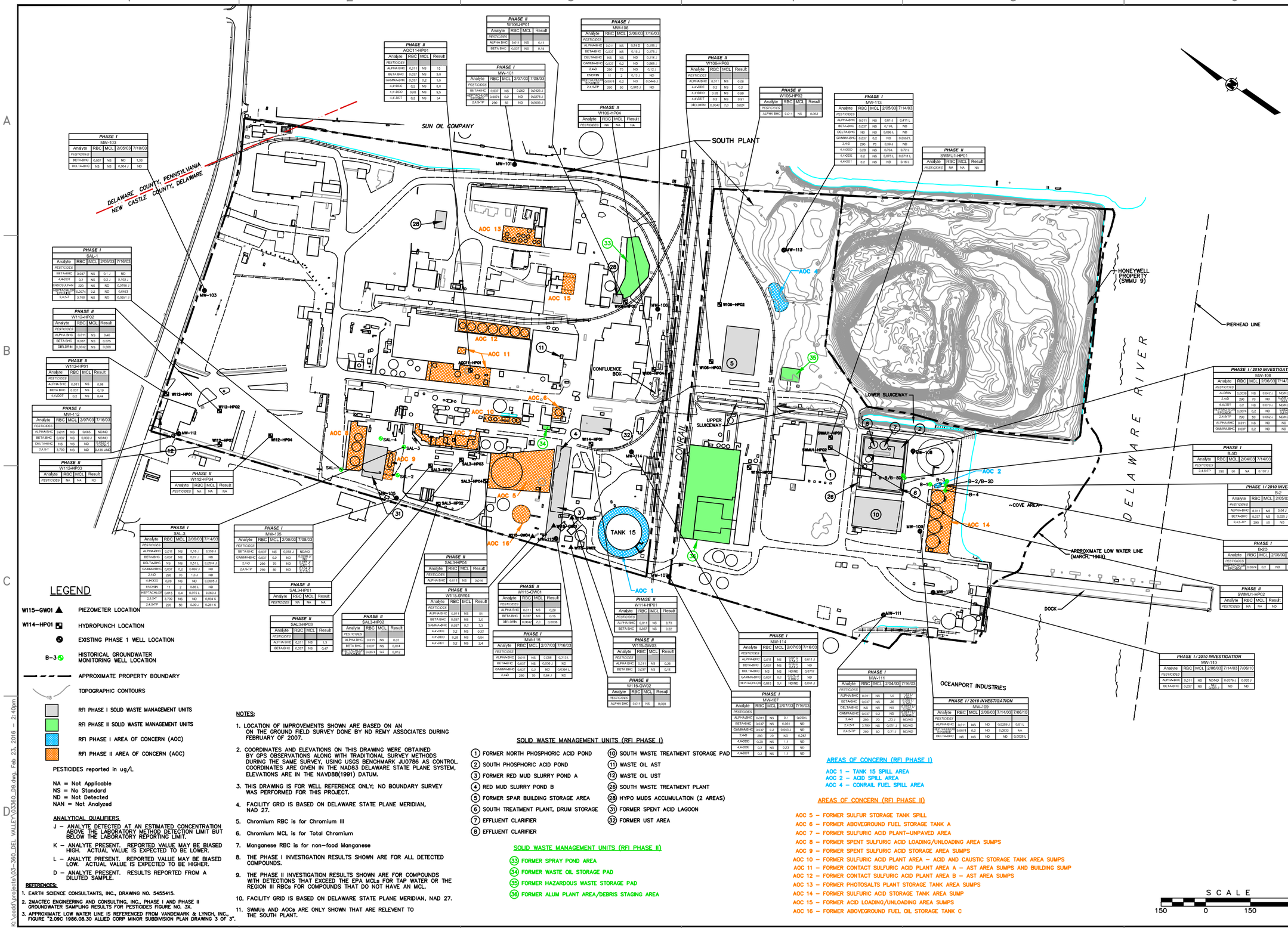
CHEMTRADE LOGISTICS LLC
PARSIPPANY, NEW JERSEY

JOB NO.: 03-360
DATE: 06-23-15
SCALE: SHOWN
SHEET: 0F

FIGURE 8

K:\cadd\projects\03-360_DEL VALLEY\03360_09.dwg, Feb 23, 2016 - 2:41pm

22x34 SHEET
1:2.02



PHASE I — MW-103

Analyte	RBC	MCL	2/05/03	7/16/03
PESTICIDES				
BETA-BHC	0.037	NS	ND	1.33
DELTA-BHC	ND	NS	0.064 J	ND

PHASE I — SAL-1

Analyte	RBC	MCL	2/06/03	7/16/03
PESTICIDES				
BETA-BHC	0.037	NS	0.7 J	ND
4,4-DDT	0.2	NS	0.2 J	0.102 J
ENDOSULFAN I	220	NS	ND	0.0799 J
HEPTACHLOR EPOXIDE	0.0074	0.2	ND	0.0403
2,4,5-T	3,700	NS	ND	0.0267 J

PHASE II — W112-HP02

Analyte	RBC	MCL	Result
PESTICIDES			
ALPHA BHC	0.011	NS	0.46
BETA BHC	0.037	NS	0.073
DIELDRIN	0.0042	NS	0.008

PHASE II — W112-HP01

Analyte	RBC	MCL	Result
PESTICIDES			
ALPHA BHC	0.011	NS	0.08
BETA BHC	0.037	NS	0.19
4,4-DDT	0.2	NS	0.44

PHASE I — MW-112

Analyte	RBC	MCL	2/07/03	7/16/03
PESTICIDES				
ALPHA BHC	0.011	NS	0.055	ND ND
BETA BHC	0.037	NS	0.209 J	ND ND
DELTA-BHC	NS	NS	ND	0.102 J
2,4-D	3,700	NS	ND	0.138 JKB

PHASE II — W112-HP03

Analyte	RBC	MCL	Result
PESTICIDES	NA	NA	NA

PHASE II — W112-HP04

Analyte	RBC	MCL	Result
PESTICIDES	NA	NA	NA

PHASE I — SAL-3

Analyte	RBC	MCL	2/06/03	7/14/03
PESTICIDES				
ALPHA-BHC	0.011	NS	0.19 J	0.258 J
BETA-BHC	0.037	NS	0.77 J	ND
DELTA-BHC	NS	NS	0.511 J	0.0454 J
GAMMA-BHC	0.037	0.2	0.062 J	ND
2,4-D	280	70	1.3 J	ND
4,4-DDD	0.28	NS	ND	0.0605 J
KNOWN	11	2	0.66 L	ND
HEPTACHLOR EPOXIDE	0.015	0.4	0.075 L	0.263 J
2,4,5-T	3,700	NS	ND	0.094 K
2,4,5-TP	290	50	0.39 J	0.281 K

PHASE I — MW-105

Analyte	RBC	MCL	2/06/03	7/08/03
PESTICIDES				
BETA-BHC	0.037	NS	0.059 J	ND ND
GAMMA-BHC	0.037	0.2	ND	0.0277 J 0.0413 J
2,4-D	280	70	ND	0.0413 J
2,4,5-TP	290	50	ND	0.0413 J

PHASE II — AOC11-HP01

Analyte	RBC	MCL	Result
PESTICIDES			
ALPHA BHC	0.011	NS	15
BETA BHC	0.037	NS	3.0
GAMMA-BHC	0.037	0.2	1.0
4,4-DDE	0.2	NS	8.5
4,4-DDD	0.28	NS	9.5
4,4-DDT	0.2	NS	34

PHASE II — SAL3-HP01

Analyte	RBC	MCL	Result
PESTICIDES			
ALPHA BHC	0.011	NS	0.37
BETA BHC	0.037	NS	0.074
HEPTACHLOR EPOXIDE	0.0074	0.2	0.012

PHASE II — SAL3-HP02

Analyte	RBC	MCL	Result
PESTICIDES			
ALPHA BHC	0.011	NS	0.51
BETA BHC	0.037	NS	3.5
GAMMA-BHC	0.037	0.2	7.3
4,4-DDE	0.2	NS	0.32
4,4-DDD	0.28	NS	0.54
4,4-DDT	0.2	NS	2.4

PHASE II — SAL3-HP03

Analyte	RBC	MCL	Result
PESTICIDES			
ALPHA BHC	0.011	NS	0.37
BETA BHC	0.037	NS	0.47

PHASE II — SAL3-HP04

Analyte	RBC	MCL	Result
PESTICIDES			
ALPHA BHC	0.011	NS	0.014

PHASE II — W115-GW04

Analyte	RBC	MCL	Result
PESTICIDES			
ALPHA BHC	0.011	NS	51
BETA BHC	0.037	NS	3.5
GAMMA-BHC	0.037	0.2	7.3
4,4-DDE	0.2	NS	0.32
4,4-DDD	0.28	NS	0.54
4,4-DDT	0.2	NS	2.4

PHASE II — W115-GW01

Analyte	RBC	MCL	Result
PESTICIDES			
ALPHA BHC	0.011	NS	0.29
BETA BHC	0.037	NS	0.15
DIELDRIN	0.0042	7.0	0.0038

PHASE I — MW-115

Analyte	RBC	MCL	2/07/03	7/16/03
PESTICIDES				
ALPHA-BHC	0.011	NS	0.089	0.3113 L
BETA-BHC	0.037	NS	0.036 J	ND
GAMMA-BHC	0.037	0.2	ND	0.0364 L
2,4-D	280	70	0.84 J	ND

PHASE II — W115-GW02

Analyte	RBC	MCL	Result
PESTICIDES			
ALPHA BHC	0.011	NS	0.028

PHASE I — MW-108

Analyte	RBC	MCL	2/06/03	7/16/03
PESTICIDES				
ALPHA-BHC	0.011	NS	0.51 D	0.156 J
BETA-BHC	0.037	NS	0.19 J	0.179 J
DELTA-BHC	NS	NS	ND	0.114 J
GAMMA-BHC	0.037	0.2	ND	0.869 J
2,4-D	280	70	ND	0.12 J
ENDRIN	11	2	0.13 J	ND
HEPTACHLOR EPOXIDE	0.0074	0.2	ND	0.0446 J
2,4,5-TP	290	50	0.045 J	ND

PHASE II — W106-HP04

Analyte	RBC	MCL	Result
PESTICIDES	NA	NA	NA

PHASE II — W106-HP01

Analyte	RBC	MCL	Result
PESTICIDES			
ALPHA BHC	0.011	NS	0.11
BETA BHC	0.037	NS	0.14

PHASE I — MW-101

Analyte	RBC	MCL	2/07/03	7/08/03
PESTICIDES				
BETA-BHC	0.037	NS	0.092	0.0423 J
HEPTACHLOR EPOXIDE	0.0074	0.2	ND	0.0278 J
2,4,5-TP	290	50	ND	0.0533 J

PHASE II — W106-HP03

Analyte	RBC	MCL	Result
PESTICIDES			
ALPHA BHC	0.011	NS	0.08
4,4-DDE	0.2	NS	0.2
4,4-DDD	0.28	NS	0.39
4,4-DDT	0.2	NS	0.61
DIELDRIN	0.0042	7.0	0.024

PHASE II — W106-HP02

Analyte	RBC	MCL	Result
PESTICIDES			
ALPHA BHC	0.011	NS	0.052

PHASE I — MW-113

Analyte	RBC	MCL	2/05/03	7/14/03
PESTICIDES				
ALPHA-BHC	0.011	NS	0.81 J	0.411 L
BETA-BHC	0.037	NS	0.79 L	ND
DELTA-BHC	NS	NS	0.09 L	ND
GAMMA-BHC	0.037	0.2	ND	0.0502 L
2,4-D	280	70	0.39 J	ND
4,4-DDD	0.28	NS	0.76 L	0.73 L
4,4-DDE	0.2	NS	0.073 L	0.0711 L
4,4-DDT	0.2	NS	ND	0.161 L

PHASE II — SWMU1-HP01

Analyte	RBC	MCL	Result
PESTICIDES	NA	NA	NA

PHASE I — MW-114

Analyte	RBC	MCL	2/07/03	7/16/03
PESTICIDES				
ALPHA-BHC	0.011	NS	0.4 J	0.611 J
BETA-BHC	0.037	NS	0.13 J	ND
DELTA-BHC	NS	NS	ND ND	0.8737
GAMMA-BHC	0.037	0.2	0.035 J	ND
HEPTACHLOR	0.015	0.4	ND ND	0.041 J

PHASE II — W114-HP01

Analyte	RBC	MCL	Result
PESTICIDES			
ALPHA BHC	0.011	NS	0.73
BETA BHC	0.037	NS	0.22

PHASE II — W115-GW03

Analyte	RBC	MCL	Result
PESTICIDES			
ALPHA BHC	0.011	NS	0.26
BETA BHC	0.037	NS	0.14

PHASE I — MW-107

Analyte	RBC	MCL	2/07/03	7/16/03
PESTICIDES				
ALPHA-BHC	0.011	NS	0.1	0.059 L
BETA-BHC	0.037	NS	0.051	ND
GAMMA-BHC	0.037	0.2	0.043 J	ND
2,4-D	280	70	ND	0.342
4,4-DDD	0.28	NS	1.1	ND
4,4-DDE	0.2	NS	0.23	ND
4,4-DDT	0.2	NS	1.1	ND

PHASE I — MW-111

Analyte	RBC	MCL	2/04/03	7/16/03
PESTICIDES				
ALPHA-BHC	0.011	NS	1.4	0.17 J 0.131 L
BETA-BHC	0.037	NS	38	0.0931 J 0.0931 L
DELTA-BHC	NS	NS	ND	0.0797 J 0.0931 L
GAMMA-BHC	0.037	0.2	ND	0.0931 J 0.0931 L
2,4-D	280	70	23 J	ND ND
2,4,5-T	3,700	NS	0.051 J	ND ND
2,4,5-TP	290	50	0.21 J	ND ND

PHASE I / 2010 INVESTIGATION — MW-108

Analyte	RBC	MCL	2/06/03	7/14/03	7/06/10
PESTICIDES					
ALDRIN	0.0039	NS	0.042 J	ND ND	ND
2,4-D	280	70	ND	0.073 J	ND
4,4-DDT	0.2	NS	0.073 J	ND ND	ND
HEPTACHLOR EPOXIDE	0.0074	0.2	ND	0.0292 J 0.0292 J	ND
2,4,5-TP	290	50	0.052 J	ND ND	ND
ALPHA-BHC	0.011	NS	ND	ND	0.025 J
GAMMA-BHC	0.037	0.2	ND	ND	0.047

PHASE I — B-5D

Analyte	RBC	MCL	2/04/03	7/14/03
PESTICIDES				
2,4,5-TP	280	50	NA	0.707 J

PHASE I / 2010 INVESTIGATION — B-2

Analyte	RBC	MCL	2/05/03	7/16/03	7/06/10
PESTICIDES					
ALPHA-BHC	0.011	NS	0.94 J	ND	0.331 J
BETA-BHC	0.037	NS	0.826 J	ND	ND
2,4,5-TP	290	50	NS	0.0421 J	ND

PHASE I — B-2D

Analyte	RBC	MCL	2/05/03	7/16/03
PESTICIDES				
HEPTACHLOR EPOXIDE	0.0074	0.2	ND	0.1141

PHASE II — SWMU1-HP02

Analyte	RBC	MCL	Result
PESTICIDES	NA	NA	ND

PHASE I / 2010 INVESTIGATION — MW-110

Analyte	RBC	MCL	2/06/03	7/14/03	7/06/10
PESTICIDES					
ALPHA-BHC	0.011	NS	ND ND	0.0379 J	0.035 J
BETA-BHC	0.037	NS	ND	0.052 J	ND ND

PHASE I / 2010 INVESTIGATION — MW-109

Analyte	RBC	MCL	2/06/03	7/14/03	7/06/10
PESTICIDES					
ALPHA-BHC	0.011	NS	ND	0.0259 J	0.011 L
HEPTACHLOR EPOXIDE	0.0074	0.2	ND	0.0033	NA
DELTA-BHC	NS	NS	ND	ND	0.0025 L

LEGEND

- W115-GW01 ▲ PIEZOMETER LOCATION
- W114-HP01 ■ HYDROPUNCH LOCATION
- EXISTING PHASE 1 WELL LOCATION
- B-3 HISTORICAL GROUNDWATER MONITORING WELL LOCATION
- APPROXIMATE PROPERTY BOUNDARY
- 15 TOPOGRAPHIC CONTOURS
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- RFI PHASE II SOLID WASTE MANAGEMENT UNITS
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8. THE PHASE I INVESTIGATION RESULTS SHOWN ARE FOR ALL DETECTED COMPOUNDS.
9. THE PHASE II INVESTIGATION RESULTS SHOWN ARE FOR COMPOUNDS WITH DETECTIONS THAT EXCEED THE EPA MCLs FOR TAP WATER OR THE REGION III RBCs FOR COMPOUNDS THAT DO NOT HAVE AN MCL.
10. FACILITY GRID IS BASED ON DELAWARE STATE PLANE MERIDIAN, NAD 27.
11. SWMUs AND AOCs ARE ONLY SHOWN THAT ARE RELEVENT TO THE SOUTH PLANT.

SOLID WASTE MANAGEMENT UNITS (RFI PHASE I)

1. FORMER NORTH PHOSPHORIC ACID POND
2. SOUTH PHOSPHORIC ACID POND
3. FORMER RED MUD SLURRY POND A
4. RED MUD SLURRY POND B
5. FORMER SPAR BUILDING STORAGE AREA
6. SOUTH TREATMENT PLANT, DRUM STORAGE
7. EFFLUENT CLARIFIER
8. EFFLUENT CLARIFIER
10. SOUTH WASTE TREATMENT STORAGE PAD
11. WASTE OIL AST
12. WASTE OIL UST
26. SOUTH WASTE TREATMENT PLANT
28. HYPO MUDS ACCUMULATION (2 AREAS)
31. FORMER SPENT ACID LAGOON
32. FORMER UST AREA

SOLID WASTE MANAGEMENT UNITS (RFI PHASE II)

33. FORMER SPRAY POND AREA
34. FORMER WASTE OIL STORAGE PAD
35. FORMER HAZARDOUS WASTE STORAGE PAD
36. FORMER ALUM PLANT AREA/DEBRIS STAGING AREA

AREAS OF CONCERN (RFI PHASE I)

AOC 1 – TANK 15 SPILL AREA
AOC 2 – ACID SPILL AREA
AOC 4 – CONRAIL FUEL SPILL AREA

AREAS OF CONCERN (RFI PHASE II)

AOC 5 – FORMER SULFUR STORAGE TANK SPILL
AOC 6 – FORMER ABOVEGROUND FUEL STORAGE TANK A
AOC 7 – FORMER SULFURIC ACID PLANT–UNPAVED AREA
AOC 8 – FORMER SPENT SULFURIC ACID LOADING/UNLOADING AREA SUMPS
AOC 9 – FORMER SPENT SULFURIC ACID STORAGE AREA SUMPS
AOC 10 – FORMER SULFURIC ACID PLANT AREA – ACID AND CAUSTIC STORAGE TANK AREA SUMPS
AOC 11 – FORMER CONTACT SULFURIC ACID PLANT AREA A – AST AREA SUMPS AND BUILDING SUMP
AOC 12 – FORMER CONTACT SULFURIC ACID PLANT AREA B – AST AREA SUMPS
AOC 13 – FORMER PHOTOSALTS PLANT STORAGE TANK AREA SUMPS
AOC 14 – FORMER SULFURIC ACID STORAGE TANK AREA SUMP
AOC 15 – FORMER ACID LOADING/UNLOADING AREA SUMPS
AOC 16 – FORMER ABOVEGROUND FUEL OIL STORAGE TANK C

SCALE
150 0 150 300 FEET

300 Penn Center Blvd., Suite 800
Pittsburgh, Pennsylvania 15235
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COMMITMENT & INTEGRITY DRIVE RESULTS

REV	DESCRIPTION	DATE
	DESIGNED BY: R.E. JONES CHECKED BY: P.F. O'HARA	
	DRAWN BY: D.J. MARTINO I:\3360_09.dwg	

RFI PHASE I, PHASE II, AND 2010 GROUNWATER SAMPLING RESULTS FOR PESTICIDES

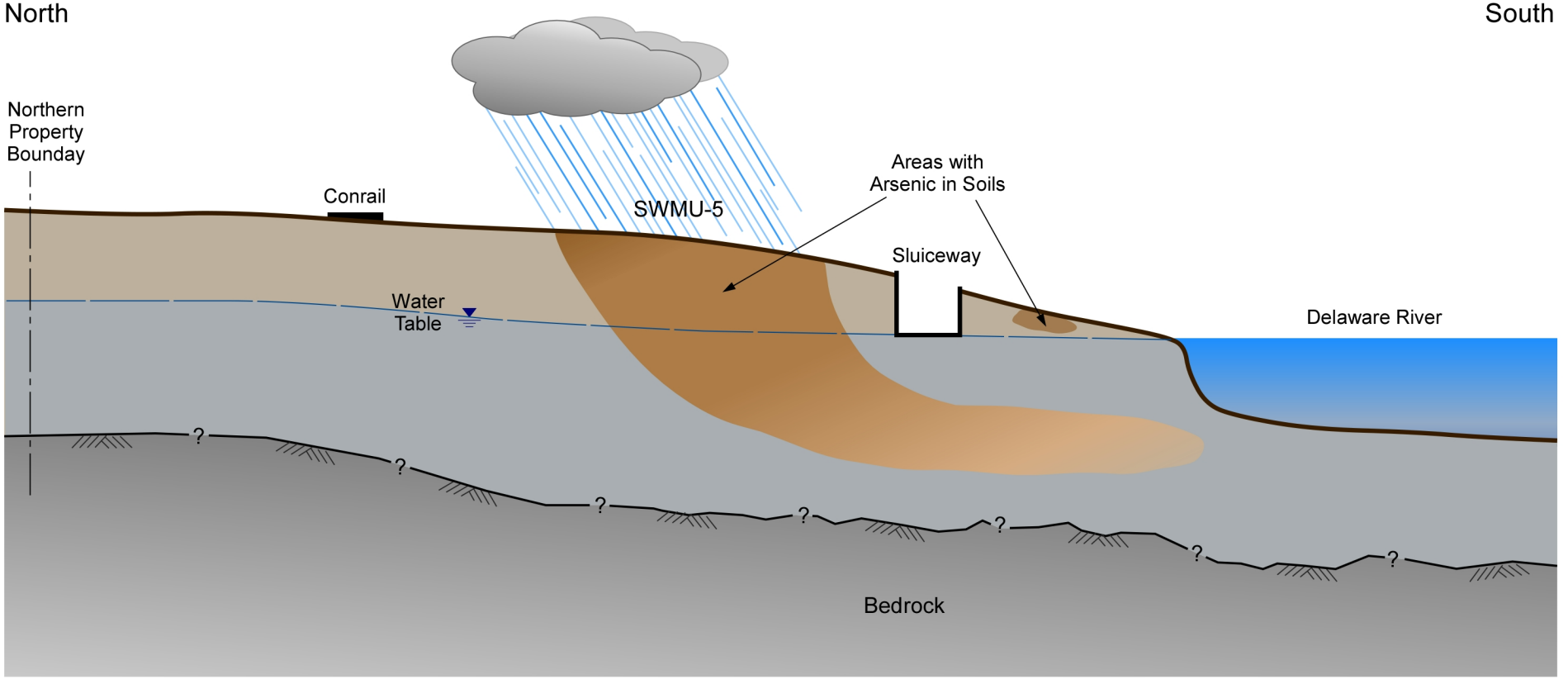
DELAWARE VALLEY WORKS (SOUTH PLANT)
CLAYMONT, DELAWARE

CHEMTRADE LOGISTICS LLC
PARSIPPANY, NEW JERSEY

JOB NO.:	03-360
DATE:	06-23-15
SCALE:	SHOWN
SHEET:	OF

FIGURE 9

K:\cadd\projects\03-360_DEL VALLEY\03360_09.dwg, Feb 23, 2016 - 2:40pm



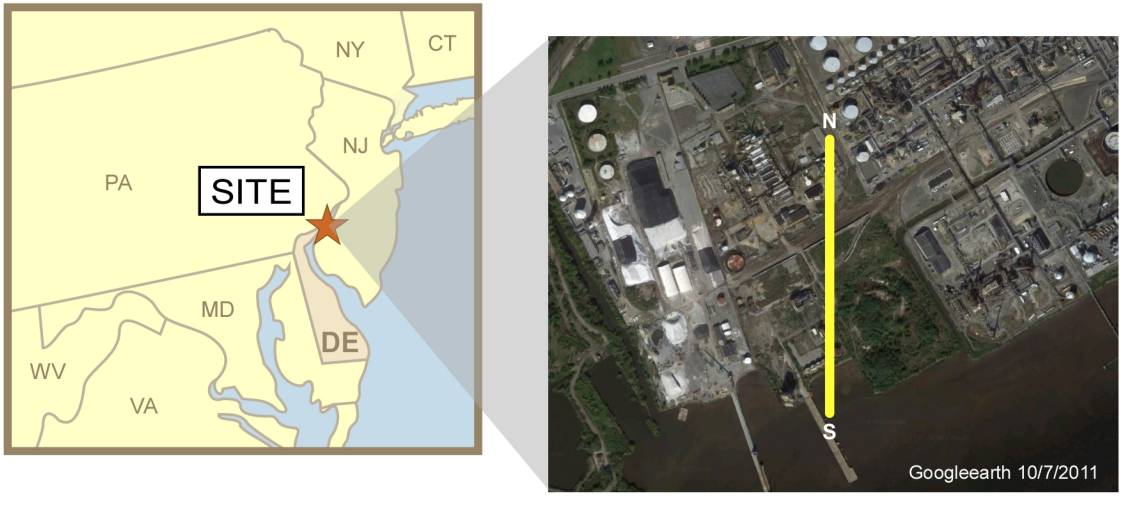


Figure 10
Conceptual Site Model
Soils and Groundwater

LEGEND

- APPROXIMATE PROPERTY BOUNDARY
- TOPOGRAPHIC CONTOURS
- RFI PHASE I SOLID WASTE MANAGEMENT UNITS
- RFI PHASE II SOLID WASTE MANAGEMENT UNITS
- RFI PHASE I AREA OF CONCERN (AOC)
- RFI PHASE II AREA OF CONCERN (AOC)
- AREA OF PRESUMPTIVE REDEVELOPMENT LOW PERMIABILITY CAPPING REMEDY (TO BE UNDERTAKEN IN PHASES)

NOTES

1. FACILITY GRID IS BASED ON DELAWARE STATE PLANE MERIDIAN, NAD 27.
2. SWMUs AND AOCs ARE ONLY SHOWN THAT ARE RELEVENT TO THE SOUTH PLANT.

SOLID WASTE MANAGEMENT UNITS (RFI PHASE I)

(1) FORMER NORTH PHOSPHORIC ACID POND
(2) SOUTH PHOSPHORIC ACID POND
(5) FORMER SPAR BUILDING STORAGE AREA
(6) SOUTH TREATMENT PLANT, DRUM STORAGE
(7) EFFLUENT CLARIFIER
(8) EFFLUENT CLARIFIER
(10) SOUTH WASTE TREATMENT STORAGE PAD
(26) SOUTH WASTE TREATMENT PLANT

SOLID WASTE MANAGEMENT UNITS (RFI PHASE II)

(35) FORMER HAZARDOUS WASTE STORAGE PAD
(36) FORMER ALUM PLANT AREA/DEBRIS STAGING AREA

AREAS OF CONCERN (RFI PHASE I)

AOC 2 – ACID SPILL AREA
AOC 4 – CONRAIL FUEL SPILL AREA

AREAS OF CONCERN (RFI PHASE II)

AOC 14 – FORMER SULFURIC ACID STORAGE TANK AREA SUMP

REFERENCES:

1. EARTH SCIENCE CONSULTANTS, INC., DRAWING NO. 5455415.
2. APPROXIMATE LOW WATER LINE IS REFERENCED FROM VANDEMARK & LYNCH, INC., FIGURE "2.09C 1986.08.30 ALLIED CORP MINOR SUBDIVISION PLAN DRAWING 3 OF 3".

SCALE
100 0 100 200 FEET

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COMMITMENT & INTEGRITY DRIVE RESULTS

REV	DESCRIPTION	DATE
	DESIGNED BY: R.E. JONES	CHECKED BY: P.F. O'HARA
	DRAWN BY: D.J. MARTINO	I:\360_019_CAP.dwg

AREA OF PRESUMPTIVE REDEVELOPMENT CAPPING REMEDY

DELAWARE VALLEY WORKS
(SOUTH PLANT)
CLAYMONT, DELAWARE

CHEMTRADE LOGISTICS LLC
PARSIPPANY, NEW JERSEY

JOB NO.:	03-360
DATE:	06-23-15
SCALE:	SHOWN
SHEET:	OF

FIGURE 11

APPENDIX A: 2010 LETTER REPORT

CUMMINGS RITER CONSULTANTS, INC.

September 27, 2010
Project No. 360.20

Mr. Russell H. Fish
Office of Remediation 3LC20
U.S. Environmental Protection Agency
1650 Arch Street
Philadelphia, PA 19103-2029

RE: SEDIMENT, SOIL AND GROUNDWATER DATA
GENERAL CHEMICAL CORPORATION
HONEYWELL INTERNATIONAL INC.
CLAYMONT, DELAWARE

Dear Mr. Fish:

On behalf of General Chemical Corporation (GCC) and Honeywell International Inc. (Honeywell), enclosed are three copies of summaries of the results for data collected in July 2010 pursuant to the May 21, 2010 USEPA-approved Work Plan. Additionally, one copy of this information is being provided to the Delaware Department of Natural Resources and Environmental Control. For each matrix, a tabular format summary and a chem-box drawing summarizing the results at each sampling location are provided. All organic data have been validated via USEPA Region III M2 data review. All inorganic data have been validated via USEPA Region III IM1 data review. Raw analytical data will be provided electronically on disk under a separate transmittal.

Honeywell and GCC are prepared to meet with USEPA at your earliest convenience to discuss the next steps with respect to the sluiceway results. We will be contacting you within the next several days to ask you for your availability to meet for this discussion.

Sincerely,
Cummings/Riter Consultants, Inc.

Robert C. Hendricks
Vice President

RCH/jar
Enclosures

cc: Mr. Bryan Ashby – Delaware Department of Natural Resources and Environmental Control (one copy)
Mr. Prashant Gupta – Honeywell International Inc. (electronic mail)
Mr. Michael Ware – General Chemical Corporation (electronic mail)
Dean Calland, Esq. – Babst, Calland, Clements, and Zomnir, P.C. (electronic mail)
Mr. Nelson Johnson – Arnold & Porter (electronic mail)
Mr. Richard Karr, P.G. – Mactec Engineering & Consulting, Inc. (electronic mail)

10 Duff Road • Suite 500 • Pittsburgh, PA 15235
(412) 241-4500 • FAX (412) 241-7500 • E-Mail: crc@cummingsriter.com

Table 1
Summary of the Sediment Sample Analytical Results
July 2010 Sampling Event
Generl Chemical Corp./Honeywell International Inc.
Claymont, Delaware

Sample ID: Date: Lab Sample ID #:	CAS No.	USEPA Region III BTAG	SE-11 7/7/2010 C0G090595-001	SE-12 7/7/2010 C0G090595-002	SE-13 7/7/2010 C0G090595-003	SE-14 7/7/2010 C0G090595-004	SE-15 7/7/2010 C0G090595-005
Pesticides (mg/kg)							
alpha-BHC	319-84-6	1.36	0.033 J	ND (0.0045)	1.0 J	0.79 J	ND (0.042)
beta-BHC	319-85-7	5*	ND (0.034)	ND (0.0045)	**3.6 J**	**3.7 J**	ND (0.042)
delta-BHC	319-86-8	6.4*	0.0094 J	0.0012 J, PG	0.0035 J	0.0013 J	0.0095 J
gamma-BHC (Lindane)	58-89-9	0.00032	**0.012 J**	**0.00091 J**	ND (0.0049)	**0.0023 J**	ND (0.042)
Aldrin	309-00-2	0.002*	ND (0.034)	ND (0.0045)	**0.0018 J**	ND (0.0048)	ND (0.042)
Endosulfan I	115-29-7	0.000107	ND (0.034)	ND (0.0045)	ND (0.0049)	ND (0.0048)	ND (0.042)
Dieldrin	60-57-1	0.00072	**0.18**	ND (0.0045)	ND (0.0049)	**0.051**	**0.062**
Endrin	72-20-8	0.00267	ND (0.034)	ND (0.0045)	ND (0.0049)	0.0016 J	ND (0.042)
Endrin ketone	–	-	ND (0.034)	ND (0.0045)	ND (0.0049)	ND (0.0048)	ND (0.042)
Endosulfan II	115-29-7	0.000107	ND (0.034)	ND (0.0045)	ND (0.0049)	ND (0.0048)	ND (0.042)
Endosulfan sulfate	–	0.000357	ND (0.034)	ND (0.0045)	ND (0.0049)	ND (0.0048)	ND (0.042)
4,4'-DDD	72-54-8	0.00122	**1.3**	**0.31**	**0.24**	**0.28**	**0.74**
4,4'-DDE	72-55-9	0.00207	**0.28 J**	**0.03 J**	**0.017 J**	**0.034 J**	**0.036 J**
4,4'-DDT	50-29-3	0.00119	**0.62**	**0.17**	**0.15**	**0.27**	**0.93**
gamma-Chlordane	12789-03-6	-	ND (0.034)	ND (0.0045)	0.0079	0.013	ND (0.042)
Metals (mg/kg)							
Arsenic	7440-38-2	7.24	**255**	**84.2**	**56.6**	**86.4**	**89.0**
Lead	7439-92-1	30.2	**488 J**	**100 J**	**69.3 J**	**76.5 J**	**69.4 J**
Percent Solids (%)	–		48.5	38.7	34.2	34.3	39.4
Percent Moisture (%)	–		52.0	63.0	66.0	66.0	61.0
Total Organic Carbon (mg/kg)	–		26,800	36,400	30,700	41,200	30,000

Prepared By: JMG 9/9/10
Checked By: SAK 9/13/10

Notes:
1. mg/kg = milligrams per kilogram
2. ND - Analyte was not detected above the laboratory reporting limit.
3. J - Analyte was reported at an estimated concentration between the method detection limit and the laboratory reporting limit.
4. PG - The percent difference between the original and confirmation analyses is greater than 40%
5. J Qualifier in Metals analysis indicates Method Blank Contamination
6. USEPA Region III BTAG - US Environmental Protection Agency Biological Technical Assistance Group Screening Benchmarks for Region III. All compounts compared to Marine Screening Benchmarks, unless denoted by *. Compounds denoted by * are compared to Freshwater Screening Benchmarks due to lack of a Marine Screening Benchmark.

Table 1
Summary of the Sediment Sample Analytical Results
July 2010 Sampling Event
Generl Chemical Corp./Honeywell International Inc.
Claymont, Delaware

Sample ID: Date: Lab Sample ID #:	CAS No.	SE-16 7/7/2010 C0G090595-006	SE-17 7/7/2010 C0G090595-007	SE-18 7/7/2010 C0G090595-008	SE-19 7/7/2010 C0G090595-009	SE-20 7/7/2010 C0G090595-010	SE-21 7/7/2010 C0G090595-011
Pesticides (mg/kg)							
alpha-BHC	319-84-6	ND (0.019)	0.032 J	ND (0.021)	ND (0.0026)	ND (0.0039)	ND (0.0039)
beta-BHC	319-85-7	ND (0.019)	ND (0.18)	ND (0.021)	**0.0039**	ND (0.0039)	ND (0.0039)
delta-BHC	319-86-8	ND (0.019)	ND (0.18)	ND (0.021)	0.00059 J	0.00064 J	ND (0.0039)
gamma-BHC (Lindane)	58-89-9	ND (0.019)	ND (0.18)	ND (0.021)	ND (0.0026)	**0.0021 J**	ND (0.0039)
Aldrin	309-00-2	ND (0.019)	ND (0.18)	ND (0.021)	ND (0.0026)	ND (0.0039)	**0.0061 J**
Endosulfan I	115-29-7	ND (0.019)	ND (0.18)	ND (0.021)	ND (0.0026)	ND (0.0039)	**0.0021 J**
Dieldrin	60-57-1	ND (0.019)	**0.46**	**0.028**	ND (0.0026)	ND (0.0039)	ND (0.0039)
Endrin	72-20-8	ND (0.019)	ND (0.18)	ND (0.021)	ND (0.0026)	ND (0.0039)	**0.01**
Endrin ketone	--	ND (0.019)	ND (0.18)	ND (0.021)	ND (0.0026)	ND (0.0039)	0.0043 J
Endosulfan II	115-29-7	ND (0.019)	ND (0.18)	ND (0.021)	ND (0.0026)	ND (0.0039)	**0.0021 J**
Endosulfan sulfate	--	ND (0.019)	ND (0.18)	ND (0.021)	ND (0.0026)	ND (0.0039)	**0.0026 J**
4,4'-DDD	72-54-8	**0.85**	**4.2**	**0.26**	**0.14**	**0.15**	**0.19**
4,4'-DDE	72-55-9	**0.064 J**	**0.18 J**	**0.038 J**	**0.016**	**0.013 J**	**0.22 J**
4,4'-DDT	50-29-3	**1.2**	**2.9**	**0.5**	**0.11**	**0.19**	**0.23**
gamma-Chlordane	12789-03-6	ND (0.019)	ND (0.18)	ND (0.021)	0.021	0.0055	ND (0.0039)
Metals (mg/kg)							
Arsenic	7440-38-2	**129.0**	**1,050**	**25.8**	**16.7**	**20.0**	**61.3**
Lead	7439-92-1	**77.5 J**	**481 J**	**64.1 J**	**50.2 J**	**38.1 J**	**127 J**
Percent Solids (%)	--	44.0	46.0	40.4	31.9	43.0	43.0
Percent Moisture (%)	--	56.0	54.0	60.0	68.0	57.0	57.0
Total Organic Carbon (mg/kg)	--	25,900	22,900	24,100	32,400	22,500	26,700

Prepared By:
Checked By:

Notes:

1. mg/kg = milligrams per kilogram
2. ND - Analyte was not detected above the laboratory reporting limit.
3. J - Analyte was reported at an estimated concentration between the method detection limit and the laboratory reporting limit.
4. PG - The percent difference between the original and confirmation analyses is greater than 40%
5. J Qualifier in Metals analysis indicates Method Blank Contamination
6. USEPA Region III BTAG - US Environmental Protection Agency Biological Technical Assistance Group Screening Benchmarks for Region III. All compounds compared to Marine Screening Benchmarks, unless denoted by *. Compounds denoted by * are compared to Freshwater Screening Benchmarks due to lack of a Marine Screening Benchmark.

Table 1
Summary of the Sediment Sample Analytical Results
July 2010 Sampling Event
Generl Chemical Corp./Honeywell International Inc.
Claymont, Delaware

Sample ID: / Date: / Lab Sample ID #:	CAS No.	SE-22 7/7/2010 C0G090595-012	SE-23 7/7/2010 C0G090595-013	SE-24 7/8/2010 C0G090595-014	SE-25 7/8/2010 C0G090595-015	SE-26 7/8/2010 C0G090595-016	SE-27 7/8/2010 C0G090595-017
Pesticides (mg/kg)							
alpha-BHC	319-84-6	ND (0.018)	ND (0.038)	0.43	0.35 J	0.35 J	**38 J**
beta-BHC	319-85-7	ND (0.018)	ND (0.038)	**0.06**	ND (1.8)	ND (0.87)	ND (140)
delta-BHC	319-86-8	ND (0.018)	ND (0.038)	0.072	ND (1.8)	0.17 J	ND (140)
gamma-BHC (Lindane)	58-89-9	ND (0.018)	ND (0.038)	**0.1**	ND (1.8)	ND (0.87)	ND (140)
Aldrin	309-00-2	**0.0055 J, PG**	ND (0.038)	ND (0.043)	ND (1.8)	ND (0.87)	ND (140)
Endosulfan I	115-29-7	ND (0.018)	ND (0.038)	ND (0.043)	ND (1.8)	ND (0.87)	ND (140)
Dieldrin	60-57-1	ND (0.018)	**0.0078 J**	ND (0.043)	ND (1.8)	ND (0.87)	ND (140)
Endrin	72-20-8	ND (0.018)	ND (0.038)	ND (0.043)	ND (1.8)	ND (0.87)	ND (140)
Endrin ketone	–	ND (0.018)	ND (0.038)	ND (0.043)	ND (1.8)	ND (0.87)	ND (140)
Endosulfan II	115-29-7	ND (0.018)	ND (0.038)	ND (0.043)	ND (1.8)	ND (0.87)	ND (140)
Endosulfan sulfate	–	ND (0.018)	ND (0.038)	ND (0.043)	ND (1.8)	ND (0.87)	ND (140)
4,4'-DDD	72-54-8	**0.35**	**1.9**	**1.5**	**68 J**	**66 J**	**1800**
4,4'-DDE	72-55-9	**0.055 J**	**0.24**	**0.34**	**8.7 J**	**5.8 J**	**220**
4,4'-DDT	50-29-3	**0.44**	**2.6**	**1.6**	**140 J**	**32 J**	**5300**
gamma-Chlordane	12789-03-6	ND (0.018)	ND (0.038)	ND (0.043)	ND (1.8)	ND (0.87)	ND (140)
Metals (mg/kg)							
Arsenic	7440-38-2	**860.0**	**165.0**	**3,500.0**	**944 J**	**960 J**	**396.0**
Lead	7439-92-1	**353 J**	**165 J**	**611 J**	**260 J**	**738 J**	**408 J**
Percent Solids (%)	–	45.6	43.6	39.1	4.5	9.6	28.9
Percent Moisture (%)	–	54.0	56.0	61.0	95.0	90.0	71.0
Total Organic Carbon (mg/kg)	–	26,600	33,700	12,400	93,300 J	58,200 J	41,500

Prepared By:
Checked By:

Notes:

1. mg/kg = milligrams per kilogram
2. ND - Analyte was not detected above the laboratory reporting limit.
3. J - Analyte was reported at an estimated concentration between the method detection limit and the laboratory reporting limit.
4. PG - The percent difference between the original and confirmation analyses is greater than 40%
5. J Qualifier in Metals analysis indicates Method Blank Contamination
6. USEPA Region III BTAG - US Environmental Protection Agency Biological Technical Assistance Group Screening Benchmarks for Region III. All compounds compared to Marine Screening Benchmarks, unless denoted by *. Compounds denoted by * are compared to Freshwater Screening Benchmarks due to lack of a Marine Screening Benchmark.

Table 1
Summary of the Sediment Sample Analytical Results
July 2010 Sampling Event
Generl Chemical Corp./Honeywell International Inc.
Claymont, Delaware

Sample ID: Date: Lab Sample ID #:	CAS No.	SE-28 7/8/2010 C0G090595-018	SE-29 7/8/2010 C0G090595-019	DUP-1 (SE-25) 7/8/2010 C0G090595-020
Pesticides (mg/kg)				
alpha-BHC	319-84-6	0.85 J	**3.9 J**	0.3 J
beta-BHC	319-85-7	**2.4 J**	**0.32 J**	ND (1.6)
delta-BHC	319-86-8	0.220 J	2.1 J	ND (1.6)
gamma-BHC (Lindane)	58-89-9	ND (1.3)	**1 J**	ND (1.6)
Aldrin	309-00-2	ND (1.3)	ND (1.1)	ND (1.6)
Endosulfan I	115-29-7	ND (1.3)	ND (1.1)	ND (1.6)
Dieldrin	60-57-1	ND (1.3)	ND (1.1)	ND (1.6)
Endrin	72-20-8	ND (1.3)	ND (1.1)	ND (1.6)
Endrin ketone	--	ND (1.3)	ND (1.1)	ND (1.6)
Endosulfan II	115-29-7	ND (1.3)	ND (1.1)	ND (1.6)
Endosulfan sulfate	--	ND (1.3)	ND (1.1)	ND (1.6)
4,4'-DDD	72-54-8	**42**	**23 J**	**56 J**
4,4'-DDE	72-55-9	**6.3 J**	**2.1 J**	**4.5 J**
4,4'-DDT	50-29-3	**74 J**	**1.2 J**	**89 J**
gamma-Chlordane	12789-03-6	ND (1.3)	ND (1.1)	ND (1.6)
Metals (mg/kg)				
Arsenic	7440-38-2	**785 J**	**1010 UJ**	**741 J**
Lead	7439-92-1	**282 J**	**2020 J**	**190 J**
Percent Solids (%)	--	6.5	7.3	5.1
Percent Moisture (%)	--	94.0	93.0	95.0
Total Organic Carbon (mg/kg)	--	80,100 J	20,000 J	58,500 J

Prepared By:
Checked By:

Notes:

1. mg/kg = milligrams per kilogram
2. ND - Analyte was not detected above the laboratory reporting limit.
3. J - Analyte was reported at an estimated concentration between the method detection limit and the laboratory reporting limit.
4. PG - The percent difference between the original and confirmation analyses is greater than 40%
5. J Qualifier in Metals analysis indicates Method Blank Contamination
6. USEPA Region III BTAG - US Environmental Protection Agency Biological Technical Assistance Group Screening Benchmarks for Region III. All compounts compared to Marine Screening Benchmarks, unless denoted by *. Compounds denoted by * are compared to Freshwater Screening Benchmarks due to lack of a Marine Screening Benchmark.

Table 2
Summary of the Soil Sample Analytical Results
July 2010 Sampling Event
Generl Chemical Corp./Honeywell International Inc.
Claymont, Delaware

Sample ID: Date: Lab Sample ID #:	CAS No.	USEPA Carcinogenic Industrial RSL	USEPA Noncancer Industrial RSL	SP-1 7/1/2010 C0G090598-001	SP-2 7/1/2010 C0G090598-002	SP-3 7/1/2010 C0G090598-005	SP-4 7/1/2010 C0G090598-004	SP-5 7/1/2010 C0G090598-003
Pesticides (mg/kg)								
alpha-BHC	319-84-6	0.27	4900	**2.4**	ND (0.2)	ND (0.096)	0.0017 J	ND (0.021)
beta-BHC	319-85-7	0.96	-	**2.2**	ND (0.2)	ND (0.096)	ND (0.0092)	ND (0.021)
delta-BHC	319-86-8	-	-	0.320 J, PG	ND (0.2)	ND (0.096)	ND (0.0092)	ND (0.021)
gamma-BHC (Lindane)	58-89-9	2.1	240	1.4	ND (0.2)	ND (0.096)	ND (0.0092)	ND (0.021)
Heptachlor	76-44-8	0.38	310	ND (0.86)	ND (0.2)	ND (0.096)	ND (0.0092)	ND (0.021)
Aldrin	309-00-2	0.1	18	ND (0.86)	ND (0.2)	ND (0.096)	ND (0.0092)	ND (0.021)
Heptachlor epoxide	1024-57-3	0.19	8	ND (0.86)	ND (0.2)	ND (0.096)	ND (0.0092)	ND (0.021)
Endosulfan I	115-29-7	-	3700	ND (0.86)	ND (0.2)	ND (0.096)	ND (0.0092)	ND (0.021)
Dieldrin	60-57-1	0.11	31	**0.180 J**	ND (0.2)	**0.49**	ND (0.0092)	0.0064 J
Endrin	72-20-8	-	180	ND (0.86)	ND (0.2)	0.74	0.065	ND (0.021)
Endrin ketone	--	-	-	ND (0.86)	ND (0.2)	ND (0.096)	ND (0.0092)	ND (0.021)
Endosulfan II	115-29-7	-	3700	0.190 J, PG	ND (0.2)	ND (0.096)	ND (0.0092)	ND (0.021)
Endosulfan sulfate	--	-	-	ND (0.86)	ND (0.2)	ND (0.096)	ND (0.0092)	ND (0.021)
4,4'-DDD	72-54-8	7.2	-	**22**	5.7	1.6	0.062	0.37
4,4'-DDE	72-55-9	5.1	-	**9.3**	2.2	1.4	0.087	0.14
4,4'-DDT	50-29-3	7	430	**55**	**10**	4.5	0.25	0.85
Methoxychlor	72-43-5	-	3100	ND (1.7)	ND (0.4)	ND (0.19)	ND (0.018)	ND (0.042)
alpha-Chlordane	12789-03-6	6.5	400	ND (0.86)	ND (0.0002)	ND (0.096)	ND (0.0092)	ND (0.021)
gamma-Chlordane	12789-03-6	6.5	400	0.670 J	0.130 J	0.036 J, PG	ND (0.0092)	ND (0.021)
Metals (mg/kg)								
Arsenic	7440-38-2	1.6	260	**973**	**123**	**84**	**179**	**159**
Lead	7439-92-1	-	800	**3,400**	382	314	**1,230**	250
Percent Solids (%)	--			97.4	83.5	86.0	90.1	77.6
Percent Moisture (%)	--			2.6	17.0	14.0	9.9	22.0
Total Organic Carbon (mg/kg)	--			43,900	135,000	210,000	2,760	3,350

Notes:

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4. PG - The percent difference between the original and confirmation analyses is greater than 40%
5. E - Analyte reported with matrix interference
6. B - Analyte was reported at an estimated concentration between the method detection limit and the laboratory reporting limit in Metals Analysis

Table 2
Summary of the Soil Sample Analytical Results
July 2010 Sampling Event
Generl Chemical Corp./Honeywell International Inc.
Claymont, Delaware

Sample ID: Date: Lab Sample ID #:	CAS No.	USEPA Carcinogenic Industrial RSL	USEPA Noncancer Industrial RSL	SP-6 7/7/2010 C0G090598-009	SP-7 7/7/2010 C0G090598-008	SP-8 7/7/2010 C0G090598-006	SP-9 7/7/2010 C0G090598-007	SP-10 7/7/2010 C0G090598-012
Pesticides (mg/kg)								
alpha-BHC	319-84-6	0.27	4900	ND (0.019)	ND (0.017)	ND (0.019)	ND (0.00097)	ND (0.00093)
beta-BHC	319-85-7	0.96	-	0.0056 J	ND (0.017)	ND (0.019)	ND (0.00097)	ND (0.00093)
delta-BHC	319-86-8	-	-	ND (0.019)	ND (0.017)	ND (0.019)	ND (0.00097)	0.00014 J
gamma-BHC (Lindane)	58-89-9	2.1	240	0.0063 J	ND (0.017)	ND (0.019)	0.0004 J	0.0013
Heptachlor	76-44-8	0.38	310	ND (0.019)	0.061 J	ND (0.019)	ND (0.00097)	ND (0.00093)
Aldrin	309-00-2	0.1	18	ND (0.019)	**0.23**	ND (0.019)	ND (0.00097)	ND (0.00093)
Heptachlor epoxide	1024-57-3	0.19	8	ND (0.019)	**0.28**	ND (0.019)	ND (0.00097)	ND (0.00093)
Endosulfan I	115-29-7	-	3700	ND (0.019)	ND (0.017)	ND (0.019)	ND (0.00097)	ND (0.00093)
Dieldrin	60-57-1	0.11	31	0.09	ND (0.017)	0.092	0.0044	0.001
Endrin	72-20-8	-	180	0.14	0.22	ND (0.019)	ND (0.00097)	ND (0.00093)
Endrin ketone	--	-	-	0.017 J	0.0097 J	ND (0.019)	0.00054 J	0.00016 J
Endosulfan II	115-29-7	-	3700	ND (0.019)	ND (0.017)	ND (0.019)	ND (0.00097)	0.00031 J
Endosulfan sulfate	--	-	-	ND (0.019)	ND (0.017)	ND (0.019)	0.00023 J	0.00061 J
4,4'-DDD	72-54-8	7.2	-	0.55	0.31	0.3	0.017	0.0019 PG
4,4'-DDE	72-55-9	5.1	-	0.74	0.79	0.31	0.021	0.0016
4,4'-DDT	50-29-3	7	430	1	1.1	0.5	0.063	0.0055
Methoxychlor	72-43-5	-	3100	ND (0.038)	ND (0.034)	ND (0.038)	ND (0.0019)	ND (0.0019)
alpha-Chlordane	12789-03-6	6.5	400	ND (0.019)	0.009 J	ND (0.019)	ND (0.00097)	ND (0.00093)
gamma-Chlordane	12789-03-6	6.5	400	0.016 J	0.18 J	0.033	ND (0.00097)	ND (0.00093)
Metals (mg/kg)								
Arsenic	7440-38-2	1.6	260	**94.1**	**37.5**	**50.2**	**8.9**	0.24 B
Lead	7439-92-1	-	800	323	477	244	143	39.1
Percent Solids (%)	--			87.1	97.1	86.9	85.9	88.7
Percent Moisture (%)	--			13.0	2.9	13.0	14.0	11.0
Total Organic Carbon (mg/kg)	--			94,700	45,900	121,000	11,700	8,880

Notes:

1. µg/kg = micrograms per kilogram, mg/kg = milligrams per kilogram
2. ND - Analyte was not detected above the laboratory reporting limit.
3. J - Analyte was reported at an estimated concentration between the method detection limit and the laboratory reporting limit.
4. PG - The percent difference between the original and confirmation analyses is greater than 40%
5. E - Analyte reported with matrix interference
6. B - Analyte was reported at an estimated concentration between the method detection limit and the laboratory reporting limit in Metals Analysis

Table 2
Summary of the Soil Sample Analytical Results
July 2010 Sampling Event
Generl Chemical Corp./Honeywell International Inc.
Claymont, Delaware

Sample ID: Date: Lab Sample ID #:	CAS No.	USEPA Carcinogenic Industrial RSL	USEPA Noncancer Industrial RSL	SP-11 7/7/2010 C0G090598-010	SP-12 7/7/2010 C0G090598-011	SP-13 7/8/2010 C0G090598-014	SP-14 7/8/2010 C0G090598-015	SP-15 7/8/2010 C0G090598-016
Pesticides (mg/kg)								
alpha-BHC	319-84-6	0.27	4900	0.00044 J	ND (0.001)	ND (0.0019)	ND (0.0018)	0.0026 J
beta-BHC	319-85-7	0.96	-	ND (0.0011)	ND (0.001)	0.0011 J	ND (0.0018)	ND (0.011)
delta-BHC	319-86-8	-	-	ND (0.0011)	0.00022 J	0.00035 J	0.0068 J	ND (0.011)
gamma-BHC (Lindane)	58-89-9	2.1	240	0.00079 J	0.00063 J	0.0017 J	0.0011 J	ND (0.011)
Heptachlor	76-44-8	0.38	310	ND (0.0011)	ND (0.001)	ND (0.0019)	0.0087 J	ND (0.011)
Aldrin	309-00-2	0.1	18	0.0011	ND (0.001)	0.00051 J	0.022 PG	ND (0.011)
Heptachlor epoxide	1024-57-3	0.19	8	0.001 J	0.00029 J	ND (0.0019)	0.037	ND (0.011)
Endosulfan I	115-29-7	-	3700	ND (0.0011)	ND (0.001)	ND (0.0019)	ND (0.0018)	ND (0.011)
Dieldrin	60-57-1	0.11	31	0.00098 J	0.00069 J	0.00060 J	ND (0.0018)	0.026
Endrin	72-20-8	-	180	0.0014 J	0.00029 J	0.017	0.023	ND (0.011)
Endrin ketone	–	-	-	0.0016 J	0.00067 J	ND (0.0019)	0.0021 PG	ND (0.011)
Endosulfan II	115-29-7	-	3700	ND (0.0011)	ND (0.001)	ND (0.0019)	ND (0.0018)	ND (0.011)
Endosulfan sulfate	–	-	-	0.001 J	ND (0.001)	ND (0.0019)	ND (0.0018)	ND (0.011)
4,4'-DDD	72-54-8	7.2	-	0.0081 PG	0.0061	0.034	0.014	0.11
4,4'-DDE	72-55-9	5.1	-	0.0068	0.0089	0.029	0.015 J	0.075
4,4'-DDT	50-29-3	7	430	0.023	0.028	0.087	0.038	0.38
Methoxychlor	72-43-5	-	3100	ND (0.0021)	ND (0.0021)	ND (0.0039)	ND (0.0036)	ND (0.022)
alpha-Chlordane	12789-03-6	6.5	400	ND (0.0011)	ND (0.001)	ND (0.0019)	ND (0.0018)	ND (0.011)
gamma-Chlordane	12789-03-6	6.5	400	0.0005 J	ND (0.001)	0.0022 J	0.023 PG	ND (0.011)
Metals (mg/kg)								
Arsenic	7440-38-2	1.6	260	**11.5**	0.98	0.44 B	**6.1**	**8.7**
Lead	7439-92-1	-	800	128	60.9	77.7	248	108
Percent Solids (%)	–			78.3	79.7	86.1	93.1	77.3
Percent Moisture (%)	–			22.0	20.0	14.0	6.9	23.0
Total Organic Carbon (mg/kg)	–			48,700	39,800	9,910	48,300	14,800

Notes:

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2. ND - Analyte was not detected above the laboratory reporting limit.
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5. E - Analyte reported with matrix interference
6. B - Analyte was reported at an estimated concentration between the method detection limit and the laboratory reporting limit in Metals Analysis

Table 2
Summary of the Soil Sample Analytical Results
July 2010 Sampling Event
Generl Chemical Corp./Honeywell International Inc.
Claymont, Delaware

Sample ID: Date: Lab Sample ID #:	CAS No.	USEPA Carcinogenic Industrial RSL	USEPA Noncancer Industrial RSL	SP-16 7/8/2010 C0G090598-013	DUP-1 (SP-16) 7/8/2010 C0G090598-017	SP-17 7/8/2010 C0G090603-005	SP-18 7/8/2010 C0G090603-003	SP-19 7/8/2010 C0G090603-003
Pesticides (mg/kg)								
alpha-BHC	319-84-6	0.27	4900	ND (0.0011)	ND (0.00046)	ND (0.034)	ND (0.017)	ND (0.017)
beta-BHC	319-85-7	0.96	-	ND (0.0011)	0.001	ND (0.034)	ND (0.017)	ND (0.017)
delta-BHC	319-86-8	-	-	ND (0.0011)	ND (0.00046)	ND (0.034)	ND (0.017)	ND (0.017)
gamma-BHC (Lindane)	58-89-9	2.1	240	0.00065 J	0.0007	0.0074 J, PG	0.0065 J	ND (0.017)
Heptachlor	76-44-8	0.38	310	ND (0.0011)	0.00017 J	ND (0.034)	ND (0.017)	ND (0.017)
Aldrin	309-00-2	0.1	18	ND (0.0011)	0.0021	ND (0.034)	ND (0.017)	0.0066 J, PG
Heptachlor epoxide	1024-57-3	0.19	8	ND (0.0011)	0.00087 J	ND (0.034)	ND (0.017)	ND (0.017)
Endosulfan I	115-29-7	-	3700	ND (0.0011)	ND (0.00046)	ND (0.034)	ND (0.017)	ND (0.017)
Dieldrin	60-57-1	0.11	31	0.0023 J	0.0024 J	**0.23**	0.1	**0.27**
Endrin	72-20-8	-	180	0.001 J	0.0012	ND (0.034)	ND (0.017)	0.008 J, PG
Endrin ketone	--	-	-	0.0014	0.0012 J	ND (0.034)	0.011 J, PG	0.0055 J, PG
Endosulfan II	115-29-7	-	3700	ND (0.0011)	ND (0.00046)	ND (0.034)	ND (0.017)	ND (0.017)
Endosulfan sulfate	--	-	-	ND (0.0011)	0.00018 J	ND (0.034)	ND (0.017)	ND (0.017)
4,4'-DDD	72-54-8	7.2	-	0.0099	0.0066	0.8	0.35	1.2
4,4'-DDE	72-55-9	5.1	-	0.0095	0.011	0.75	0.24	0.057 PG
4,4'-DDT	50-29-3	7	430	0.041 J	0.020 J	1.8	0.9	1.2
Methoxychlor	72-43-5	-	3100	ND (0.0023)	ND (0.00092)	ND (0.067)	ND (0.034)	0.0082 J, PG
alpha-Chlordane	12789-03-6	6.5	400	ND (0.0011)	ND (0.00046)	ND (0.034)	ND (0.017)	ND (0.017)
gamma-Chlordane	12789-03-6	6.5	400	ND (0.0011)	0.0014 J	0.067	0.0054 J, PG	0.0059 J, PG
Metals (mg/kg)								
Arsenic	7440-38-2	1.6	260	1.1	1.0	**540**	**703**	**526**
Lead	7439-92-1	-	800	89.4	86.9	740	**1,280**	753
Percent Solids (%)	--			72.5	72.2	98.8	98.6	96.1
Percent Moisture (%)	--			27.0	28.0	1.2	1.4	4.0
Total Organic Carbon (mg/kg)	--			35,000	35,200	19,500	89,100	23,200

Notes:

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5. E - Analyte reported with matrix interference
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Table 2
Summary of the Soil Sample Analytical Results
July 2010 Sampling Event
Generl Chemical Corp./Honeywell International Inc.
Claymont, Delaware

Sample ID: Date: Lab Sample ID #:	CAS No.	USEPA Carcinogenic Industrial RSL	USEPA Noncancer Industrial RSL	SP-20 7/8/2010 C0G090603-002	SP-21 7/8/2010 C0G090603-001
Pesticides (mg/kg)					
alpha-BHC	319-84-6	0.27	4900	ND (0.0036)	ND (0.0095)
beta-BHC	319-85-7	0.96	-	0.0028 J, PG	ND (0.0095)
delta-BHC	319-86-8	-	-	0.011 PG	0.0062 J, PG
gamma-BHC (Lindane)	58-89-9	2.1	240	0.0064 PG	0.0038 J, PG
Heptachlor	76-44-8	0.38	310	0.014 PG	ND (0.0095)
Aldrin	309-00-2	0.1	18	0.05 PG	0.034 PG
Heptachlor epoxide	1024-57-3	0.19	8	0.027 PG	ND (0.0095)
Endosulfan I	115-29-7	-	3700	0.0012 J, PG	ND (0.0095)
Dieldrin	60-57-1	0.11	31	0.0057 PG	0.013 PG
Endrin	72-20-8	-	180	ND (0.0036)	0.051 PG
Endrin ketone	--	-	-	ND (0.0036)	0.0091 J, PG
Endosulfan II	115-29-7	-	3700	ND (0.0036)	ND (0.0095)
Endosulfan sulfate	--	-	-	0.0034 J	0.0038 J, PG
4,4'-DDD	72-54-8	7.2	-	0.012 PG	0.094 PG
4,4'-DDE	72-55-9	5.1	-	ND (0.0036)	0.11
4,4'-DDT	50-29-3	7	430	0.096 PG	0.5
Methoxychlor	72-43-5	-	3100	ND (0.0072)	ND (0.019)
alpha-Chlordane	12789-03-6	6.5	400	ND (0.0036)	ND (0.0095)
gamma-Chlordane	12789-03-6	6.5	400	0.046 PG	0.039 PG
Metals (mg/kg)					
Arsenic	7440-38-2	1.6	260	**5,520**	**102 E**
Lead	7439-92-1	-	800	**3,590**	**2,410**
Percent Solids (%)	--			91.6	88.0
Percent Moisture (%)	--			8.2	12
Total Organic Carbon (mg/kg)	--			58,800	127,000

Notes:

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3. J - Analyte was reported at an estimated concentration between the method detection limit and the laboratory reporting limit.
4. PG - The percent difference between the original and confirmation analyses is greater than 40%
5. E - Analyte reported with matrix interference
6. B - Analyte was reported at an estimated concentration between the method detection limit and the laboratory reporting limit in Metals Analysis

Prepared By: JMG 9/9/10
Checked By: SAK 9/13/10

Table 3
Summary of the Groundwater Sample Analytical Results
July 2010 Sampling Event
Generl Chemical Corp./Honeywell International Inc.
Claymont, Delaware

Sample ID: Date: Lab Sample ID #:	CAS No.	MW-16 7/6/2010 C0G070469-001	MW-17 7/6/2010 C0G070469-002	MW-18 7/6/2010 C0G070469-003	MW-108 7/6/2010 C0G070469-006	MW-109 7/6/2010 C0G070469-005	MW-110 7/6/2010 C0G070469-004	DUP-1 (MW-110) 7/6/2010 C0G070469-008	B-2 7/6/2010 C0G070469-007
Pesticides (ug/L)									
alpha-BHC	319-84-6	0.40	0.088 JL	52.0	0.025 J	0.01 L	0.035 J	0.014 J	0.031 J
beta-BHC	319-85-7	ND (0.13)	0.3 L	5.5	0.0094	R (0.0062)	0.015 J	0.0043 J	0.0062 J
delta-BHC	319-86-8	0.54	ND (0.0066) L	20.0	0.0055 J	0.0026 JL	0.0082 J	0.0022 J	0.0091 J
gamma-BHC (Lindane)	58-89-9	ND (0.13)	0.042 JL	ND (2.5)	0.047	R (0.0062)	0.0045 J	0.0027 J	0.010 J
Heptachlor	76-44-8	ND (0.13)	ND (0.0066) L	ND (2.5)	0.0027 J	R (0.0062)	ND (0.0012)	ND (0.0025)	ND (0.0062)
Aldrin	309-00-2	ND (0.13)	ND (0.0066) L	ND (2.5)	ND (0.0025)	R (0.0062)	0.0018 J	ND (0.0025)	ND (0.0062)
Heptachlor epoxide	1024-57-3	ND (0.13)	ND (0.0066) L	ND (2.5)	ND (0.0025)	R (0.0062)	0.0041	ND (0.0025)	ND (0.0062)
4,4'-DDD	72-54-8	ND (0.13)	0.14 L	ND (2.5)	ND (0.0025)	R (0.0062)	ND (0.0012)	ND (0.0025)	ND (0.0062)
4,4'-DDE	72-55-9	ND (0.13)	0.025 L	ND (2.5)	ND (0.0025)	R (0.0062)	ND (0.0012)	ND (0.0025)	ND (0.0062)
4,4'-DDT	50-29-3	ND (0.13)	ND (0.066) L	ND (2.5)	ND (0.0025)	R (0.0062)	ND (0.0012)	ND (0.0025)	ND (0.0062)
Methoxychlor	72-43-5	ND (0.24)	ND (0.013) L	ND (4.8)	0.0031 J	R (0.012)	ND (0.0024)	ND (0.0048)	ND (0.012)
gamma-Chlordane	12789-03-6	ND (0.13)	0.026 L	ND (2.5)	0.021	R (0.0062)	0.01 J	0.063 J	0.018
Metals (ug/L)									
Arsenic	7440-38-2	1,220	9.9	9,690	30,200	4,130	2,350	2,180	8,300
Iron*	7439-89-6	161,000	31,300	558,000	147,000	21,200	18,200	16,400	132,000
Lead	7439-92-1	14.8	4.4 B	56.4	255	2.1 B	104	69.1	112
Dissolved Arsenic	7440-38-2	63.2 J	ND (5.0)	5070 J	28600 J	3820 J	1540 J	1400 J	8260 J
Dissolved Lead	7439-92-1	ND (5.0)	ND (5.0)	1.2 B	12.5	ND (5.0)	4.8 B	ND (5.0)	0.38 B
General Chemistry (mg/L)									
Chloride	--	41.6	20.1	19.8	34.4	65.3	104.0	104.0	60.2
Nitrate as N	--	0.12 B	0.090 B	ND (0.25)	0.093 B	ND (0.25)	ND (0.25)	0.10 B	ND (0.25)
Nitrite as N	--	ND (0.25)	ND (0.25)	ND (0.25)	ND (0.25)	0.22 B	ND (0.25)	ND (0.25)	ND (0.25)
Sulfate	--	2870 L	3790 L	3520 L	1480 L	954 L	1510 L	1430 L	1600 L
Phosphorus, Total	--	24	0.067 J	4.4	32.0	15.0	1.2	1.3	94.0
Ferrous Iron	--	38 J	32 J	630 J	170 J	23 J	19 J	19 J	150 J
Sulfide	--	ND (1.0)	ND (1.0)	ND (1.0)	2.8	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
Sulfite	--	ND (5.0) J	ND (5.0) J	7.4 J	ND (5.0) J	ND (5.0) J	ND (5.0) J	ND (5.0) J	ND (5.0) J
Ferric Iron	--	120 J	1.0 J	ND (0.1) J	ND (0.10) J	1.0 J	ND (0.10) J	ND (0.10) J	ND (0.10) J
Total Dissolved Solids	--	3,320	3,530	4,770	2,330	2,080	2,640	2,620	2,740
Total Organic Carbon	--	6.9	4.1	5.1	7.9	5.6	2.4	2.5	7.0

Notes:

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2. ND - Analyte was not detected above the laboratory reporting limit.
3. J - Analyte was reported at an estimated concentration between the method detection limit and the laboratory reporting limit.
4. PG - The percent difference between the original and confirmation analyses is greater than 40%
5. E - Analyte reported with matrix interference
6. J Qualifier in Metals analysis indicates Method Blank Contamination
7. B - Analyte was reported at an estimated concentration between the method detection limit and the laboratory reporting limit in Metals Analysis
8. H - Sample was prepped or analyzed beyond specified holding time
9. HF - Field parameter with a holding time of 15 minutes
10. R - reported result was rejected

Prepared By: JMG 9/9/10
Checked By: SAK 9/13/10

DATA VALIDATION SUMMARY REPORT
JULY 2010 GROUNDWATER SAMPLES
HONEYWELL – CLAYMONT
CLAYMONT, DELAWARE

1.0 INTRODUCTION

Data validation was completed on eight groundwater samples collected by MACTEC in July, 2010. A summary of samples included in this review is presented in Table 1. Samples were analyzed for pesticides, arsenic (total and dissolved), lead (total and dissolved), iron (total and ferrous), chloride, nitrate-nitrogen, nitrite-nitrogen, and total dissolved solids by Test America located in Pittsburgh, Pennsylvania. Samples were analyzed for total organic carbon by Test America located in North Canton, Ohio. Samples were analyzed for sulfate and sulfide by Test America located in Savannah, Georgia. Sample results were reported in SDG COG070469. The following U.S. Environmental Protection Agency (USEPA) SW846 analytical methods (USEPA, 1996; USEPA, 1993a) and American Public Health Association (APHA) Standard Methods were performed by Test America:

- Pesticides by USEPA Method 8081A
- Metals (iron, arsenic, and lead) by USEPA Method 6020A
- Iron by USEPA Method 6010B
- Iron (ferrous and ferric) by APHA SM3500FED
- Total Organic Carbon by APHA 18th Edition SM5310C
- Chloride, Nitrate/Nitrite, and Sulfate by USEPA Method 300.0A
- Sulfide by USEPA Method 376.1
- Sulfite by USEPA Method 377.1
- Total Phosphorous by USEPA Method 365.4
- Total Dissolved Solids by APHA 20th Edition SM2540C

Data quality reviews were completed using general procedures described in Region III Modifications to National Functional Guidelines for Organic Data Review (1994) and Region III Modifications to the Laboratory Data Validation Functional Guidelines for Evaluating Inorganic Analysis (1993b). Data qualifications were completed if necessary in accordance with the guidelines and professional judgment using the following qualifiers:

Inorganic Qualifiers:

L = Analyte present. The reported value is biased low.
J = Analyte present. The reported value may not be accurate or precise.
U = Not detected. The associated number indicates approximate sample concentration necessary to be detected.

Organic Qualifiers:

J = Analyte present. The reported value may not be accurate or precise.
U = Not detected. The associated number indicates approximate sample concentration necessary to be detected.
R = Reported result was rejected.
L = The reported value is biased low.

Result for non-detects were reported as U qualified results at the sample quantitation limits (QLs). Target analyte results that were detected at concentrations between the method detection limit (MDL) and QLs were reported as J qualified estimated values. A summary of data validation qualification actions is presented in Table 2. A summary of final sample results is presented in Table 3.

2.0 DATA VALIDATION ACTIONS AND OBSERVATIONS

An EPA Region III Level M2 data review was completed on the pesticide data reported in SDG COG070469. The Region III M2 guidelines are applicable to pesticide data generated using Contract Laboratory Program Statement of Work (CLP SOW) methods (i.e. SOM01.2). USEPA SW-846 Method 8081 was used to analyze samples for this project. Some QC checks that are required using CLP methods but not required in Method 8081 including resolution check standards, instrument blanks, florisil cleanup, and GC/MS confirmation of detections were not completed by the lab, and data were not available for review.

Most pesticide samples were analyzed at dilutions due to matrix or high concentrations of target compounds. Detection limits for target compounds that were not detected in samples were adjusted due to the dilution.

With the exception of the items discussed below, quality control (QC) parameters and measurements checked during validation met requirements in the analytical method and/or validation guidelines. Unless specified below, results are interpreted to be usable as reported by the laboratory.

2.1 Pesticides

Data were evaluated for the following parameters:

* Collection and Preservation
* Holding Times
* Data Completeness
* Initial Calibration
  Continuing Calibration
* QC Blank Review
* Laboratory Control Samples/Laboratory Control Sample Duplicate (LCS/LCSD)
* Matrix Spike/Matrix Spike Duplicate (MS/MSD)
  Field Duplicates
  Surrogate Recoveries
* Instrument Performance Checks
  Target Compound Identification/Quantitation

*- all criteria were met for this parameter

Continuing Calibration

The relative percent difference (RPD) for endrin (28) exceeded the QC limit of 25. Endrin was not detected in samples, and the reporting limits for all samples were qualified estimated (UJ).

Surrogate Recoveries

The percent recovery of surrogate tetrachloro-meta-xylene (TCMX) in sample MW-17 7/6/10 (54) was less than the lower QC limit of 60. Pesticide results in sample MW-17 7/6/10 were qualified "L" and are potentially biased low.

The percent recovery of surrogate dichlorobenzene in sample MW-109 7/6/10 (54) was less than the lower QC limit of 60. The percent recovery of TCMX was less than ten percent. In accordance with the Region III guidelines, target compound detections in sample MW-109 7/6/10 were qualified "L" and are potentially biased low. Results for target compounds that were not detected in sample MW-109 7/6/10 were qualified rejected (R).

Field Duplicates

The EPA Region III M2 validation guideline does not specify a relative percent difference (RPD) control limit for field duplicate samples. A project control limit of 30 was used when evaluating groundwater samples.

A field duplicate (DUP-1) was collected with sample MW-110 7/6/10. The RPDs for alpha-BHC (86), beta-BHC (111), delta-BHC (115), gamma-BHC (50), and gamma chlordane (145) exceed the QC limit of 30. Results for alpha-BHC, beta-BHC, delta-BHC, gamma-BHC, and gamma chlordane in samples MW-110 7/6/10 and MW-110 7/6/10DUP were qualified estimated (J/UJ).

Target Compound Identification and Quantitation

The EPA Region III M2 validation guideline does not specify a dual column precision RPD limit between results reported from two chromatographic columns. The RPD control limit of 40 that is specified in SW-846 Method 8000B was used to evaluate results reported from the primary and confirmatory column. Sample results with analytes with confirmation column RPDs greater than 40 are listed below. Results for these analytes were qualified estimated (J) in the final data set. The laboratory reported results from the primary column (MR1); chromatographic QC in the primary column was in better overall control as compared to the secondary column.

Field Sample ID	Lab Sample ID	Analyte	RPD
B-2 7/6/10	C0G070469007	alpha-BHC	59
		beta-BHC	44
		delta-BHC	110
		gamma-BHC (Lindane)	55
MW-17 7/6/10	C0G070469002	alpha-BHC	59
		gamma-BHC (Lindane)	100
MW-108 7/6/10	C0G070469006	alpha-BHC	59
		delta-BHC	96
		Heptachlor	110
		Methoxychlor	98
MW-110 7/6/10	C0G070469004	Aldrin	82
		gamma-BHC (Lindane)	110
MW-110 7/6/10 DUP	C0G070469008	beta-BHC	98

		delta-BHC	100
		gamma-BHC (Lindane)	96

2.2 Total and Dissolved Metals

Data were evaluated for the following parameters:

* Collection and Preservation
  Holding Times
* Data Completeness
* Initial Calibration
* Continuing Calibration
* Blank Contamination
* Laboratory Control Samples/Laboratory Control Sample Duplicate (LCS/LCSD)
* Matrix Spike/Matrix Spike Duplicate (MS/MSD)
* Field Duplicates
* Serial Dilutions

* - all criteria were met for this parameter

Holding Times

Ferric iron and ferrous iron are field parameters with a recommended hold time of immediate analysis upon sample collection. Sample analyses for ferrous iron were performed one day after sample collection. Sample analyses for ferric iron were performed seventeen days after sample collection. Reported detections for ferric iron and ferrous iron were qualified estimated (J). Non-detected results for ferric iron and ferrous iron were qualified estimated (UJ) at the reporting limits.

2.3 Total Organic Carbon

Data were evaluated for the following parameters:

* Collection and Preservation
* Holding Times
* Data Completeness
* Blank Contamination
* Laboratory Control Samples/Laboratory Control Sample Duplicate (LCS/LCSD)
* Matrix Spike/Matrix Spike Duplicate (MS/MSD)
* Field Duplicates
* Laboratory Duplicates

* - all criteria were met for this parameter

The results of all associated quality control measurements were within control limits, and sample results were reported without qualification.

2.4 Chloride

Data were evaluated for the following parameters:

* Collection and Preservation
* Holding Times
* Data Completeness
* Blank Contamination
* Laboratory Control Samples/Laboratory Control Sample Duplicate (LCS/LCSD)
* Matrix Spike/Matrix Spike Duplicate (MS/MSD)
* Field Duplicates
* Laboratory Duplicates

* - all criteria were met for this parameter

The results of all associated quality control measurements were within control limits, and sample results were reported without qualification.

2.5 Nitrate/Nitrite-Nitrogen

Data were evaluated for the following parameters:

* Collection and Preservation
* Holding Times
* Data Completeness
* Blank Contamination
* Laboratory Control Samples/Laboratory Control Sample Duplicate (LCS/LCSD)
* Matrix Spike/Matrix Spike Duplicate (MS/MSD)
* Field Duplicates
* Laboratory Duplicates

* - all criteria were met for this parameter

The results of all associated quality control measurements were within control limits, and sample results were reported without qualification.

2.6 Sulfate

Data were evaluated for the following parameters:

* Collection and Preservation
* Holding Times
* Data Completeness
* Blank Contamination
* Laboratory Control Samples/Laboratory Control Sample Duplicate (LCS/LCSD)
  Matrix Spike/Matrix Spike Duplicate (MS/MSD)
* Field Duplicates

* Laboratory Duplicates

* - all criteria were met for this parameter

Matrix Spike/Matrix Spike Duplicate

The MS and MSD percent recovery of sulfate in sample MW-16 (42 and 42) was less than the lower QC limit of 80. Sample results for sulfate were qualified as estimated and biased low (L).

2.7 Sulfide

Data were evaluated for the following parameters:

* Collection and Preservation
* Holding Times
* Data Completeness
* Blank Contamination
* Laboratory Control Samples/Laboratory Control Sample Duplicate (LCS/LCSD)
* Matrix Spike/Matrix Spike Duplicate (MS/MSD)
* Field Duplicates
* Laboratory Duplicates

* - all criteria were met for this parameter

The results of all associated quality control measurements were within control limits, and sample results were reported without qualification.

2.8 Sulfite

Data were evaluated for the following parameters:

* Collection and Preservation
Holding Times
* Data Completeness
* Blank Contamination
* Laboratory Control Samples/Laboratory Control Sample Duplicate (LCS/LCSD)
* Matrix Spike/Matrix Spike Duplicate (MS/MSD)
* Field Duplicates
* Laboratory Duplicates

* - all criteria were met for this parameter

Holding Times

It is recommended that sulfite samples be analyzed immediately upon sample collection. Sample analyses for sulfite were performed one day after sample collection. Sulfite was not detected in samples, and the reporting limits were qualified estimated (UJ).

2.9 Total Dissolved Solids

Data were evaluated for the following parameters:

* Collection and Preservation
* Holding Times
* Data Completeness
* QC Blanks
* Laboratory Control Samples/Laboratory Control Sample Duplicate (LCS/LCSD)
* Field Duplicates
* Laboratory Duplicates

* - all criteria were met for this parameter

The results of all associated quality control measurements were within control limits, and sample results were reported without qualification.

3.0 Total Phosphorous

Data were evaluated for the following parameters:

* Collection and Preservation
* Holding Times
* Data Completeness
* Blank Contamination
* Laboratory Control Samples/Laboratory Control Sample Duplicate (LCS/LCSD)
* Field Duplicates
* Laboratory Duplicates

* - all criteria were met for this parameter

The results of all associated quality control measurements were within control limits, and sample results were reported without qualification.

References:

American Public Health Association (APHA), 1998. "Standard Methods for the Examination of Water and Wastewater," 18th-20th Edition, 1998.

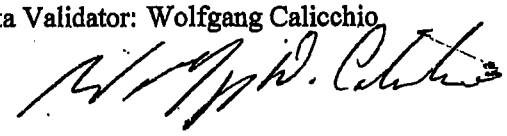
U.S. Environmental Protection Agency (USEPA), 1993a. "Methods for Chemical Analysis and Water and Wastes (MCAWW)", EPA/600/4-79-020 (March 1983) with updates and supplements EPA/600/4-91-010 (June 1991), EPA/600/R-92-129 (August 1992) and EPA/600/R-93-100 (August 1993).

U.S. Environmental Protection Agency (USEPA), Region III, 1993b. "Region III Modifications to the Laboratory Data Validation Functional Guidelines for Evaluating Inorganic Analysis"; April 1993.

U.S. Environmental Protection Agency (USEPA), Region III, 1994. "Region III Modifications to National Functional Guidelines for Organic Data Review, Multi-Media, Multi-Concentration (OLM01.0-OLM01.9)"; Central Regional Laboratory Quality Assurance Branch; Annapolis, MD; September 1994.

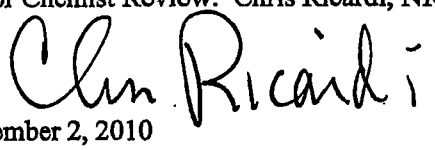
U.S. Environmental Protection Agency (USEPA), 1996. "Test Methods for Evaluating Solid Waste"; Laboratory Manual Physical/Chemical Methods; Office of Solid Waste and Emergency Response; Washington, DC; SW-846; Revision 4 -December 1996.

Data Validator: Wolfgang Calicchio



September 2, 2010

Senior Chemist Review: Chris Ricardi, NRCC-EAC



September 2, 2010

TABLE 1
SUMMARY OF SAMPLES
DATA VALIDATION SUMMARY REPORT
JULY 2010 GROUNDWATER SAMPLES
HONEYWELL – CLAYMONT
CLAYMONT, DELAWARE

			Pesticides	Arsenic and Lead (total and dissolved)	Iron	Iron	Ferrous Iron	Ferric Iron	TOC	Chloride	Nitrate/Nitrite	Sulfate	Sulfite	Sulfide	Total Phosphorous	TDS
Field Sample ID	QC Code	SDG	SW8081	SW6020A	SW6020A	SW6010B	SM3500FED	SM3500FED	SM5310C	EPA 300.0A	EPA 300.0A	EPA 300.0A	EPA 377.1	EPA 376.1	EPA 365.4	SM2540C
B-2	REG	C0G070469	21	4	1	1	1	1	1	1	1	1	1	1	1	1
DUP-1	FD	C0G070469	21	4	1	1	1	1	1	1	1	1	1	1	1	1
MW-108	REG	C0G070469	21	4	1	1	1	1	1	1	1	1	1	1	1	1
MW-109	REG	C0G070469	21	4	1	1	1	1	1	1	1	1	1	1	1	1
MW-110	REG	C0G070469	21	4	1	1	1	1	1	1	1	1	1	1	1	1
MW-16	REG	C0G070469	21	4	1	1	1	1	1	1	1	1	1	1	1	1
MW-17	REG	C0G070469	21	4	1	1	1	1	1	1	1	1	1	1	1	1
MW-18	REG	C0G070469	21	4	1	1	1	1	1	1	1	1	1	1	1	1

Notes:
Number listed under method indicates number of target analytes reported.
FD = Field Duplicate REG = Field Sample
SDG = Sample Delivery Group

TABLE 2 - VALIDATION ACTION SUMMARY
DATA VALIDATION SUMMARY REPORT
JULY 2010 GROUNDWATER SAMPLES
HONEYWELL - CLAYMONT
CLAYMONT, DELAWARE

Field Sample ID	Lab Sample ID	Type	SDG	Method	Parameter Name	Lab Result	Lab Qual	Val Qual	Reason Codes	Units
B-2 7/6/10	C0G070469007	REG	C0G070469	E300.0	Sulfate	1600		L	MSL	mg/L
MW-108 7/6/10	C0G070469006	REG	C0G070469	E300.0	Sulfate	1480		L	MSL	mg/L
MW-109 7/6/10	C0G070469005	REG	C0G070469	E300.0	Sulfate	954		L	MSL	mg/L
MW-110 7/6/10	C0G070469004	REG	C0G070469	E300.0	Sulfate	1510		L	MSL	mg/L
MW-110 7/6/10 DUP	C0G070469008	FD	C0G070469	E300.0	Sulfate	1430		L	MSL	mg/L
MW-16 7/6/10	C0G070469001	REG	C0G070469	E300.0	Sulfate	2870		L	MSL	mg/L
MW-17 7/6/10	C0G070469002	REG	C0G070469	E300.0	Sulfate	3790		L	MSL	mg/L
MW-18 7/6/10	C0G070469003	REG	C0G070469	E300.0	Sulfate	3520		L	MSL	mg/L
B-2 7/6/10	680-59149-7	REG	68059149	E377.1	Sulfite	5	U H	UJ	HTA	mg/L
MW-108 7/6/10	680-59149-6	REG	68059149	E377.1	Sulfite	5	U H	UJ	HTA	mg/L
MW-109 7/6/10	680-59149-5	REG	68059149	E377.1	Sulfite	5	U H	UJ	HTA	mg/L
MW-110 7/6/10	680-59149-4	REG	68059149	E377.1	Sulfite	5	U H	UJ	HTA	mg/L
MW-110 7/6/10 Dup	680-59149-8	FD	68059149	E377.1	Sulfite	5	U H	UJ	HTA	mg/L
MW-16 7/6/10	680-59149-1	REG	68059149	E377.1	Sulfite	5	U H	UJ	HTA	mg/L
MW-17 7/6/10	680-59149-2	REG	68059149	E377.1	Sulfite	5	U H	UJ	HTA	mg/L
MW-18 7/6/10	680-59149-3	REG	68059149	E377.1	Sulfite	7.4	H	J	HTA	mg/L
B-2 7/6/10	680-59149-7	REG	68059149	SM3500-FeD	Ferric Iron	0.1	U HF	UJ	HTG	mg/L
MW-108 7/6/10	680-59149-6	REG	68059149	SM3500-FeD	Ferric Iron	0.1	U HF	UJ	HTG	mg/L
MW-109 7/6/10	680-59149-5	REG	68059149	SM3500-FeD	Ferric Iron	1	HF	J	HTG	mg/L
MW-110 7/6/10	680-59149-4	REG	68059149	SM3500-FeD	Ferric Iron	0.1	U HF	UJ	HTG	mg/L
MW-110 7/6/10 Dup	680-59149-8	FD	68059149	SM3500-FeD	Ferric Iron	0.1	U HF	UJ	HTG	mg/L
MW-16 7/6/10	680-59149-1	REG	68059149	SM3500-FeD	Ferric Iron	120	HF	J	HTG	mg/L
MW-17 7/6/10	680-59149-2	REG	68059149	SM3500-FeD	Ferric Iron	1	HF	J	HTG	mg/L
MW-18 7/6/10	680-59149-3	REG	68059149	SM3500-FeD	Ferric Iron	0.1	U HF	UJ	HTG	mg/L
B-2 7/6/10	680-59149-7	REG	68059149	SM3500-FeD	Ferrous Iron	150	HF	J	HTG	mg/L
MW-108 7/6/10	680-59149-6	REG	68059149	SM3500-FeD	Ferrous Iron	170	HF	J	HTG	mg/L
MW-109 7/6/10	680-59149-5	REG	68059149	SM3500-FeD	Ferrous Iron	23	HF	J	HTG	mg/L
MW-110 7/6/10	680-59149-4	REG	68059149	SM3500-FeD	Ferrous Iron	19	HF	J	HTG	mg/L
MW-110 7/6/10 Dup	680-59149-8	FD	68059149	SM3500-FeD	Ferrous Iron	19	HF	J	HTG	mg/L
MW-16 7/6/10	680-59149-1	REG	68059149	SM3500-FeD	Ferrous Iron	38	HF	J	HTG	mg/L
MW-17 7/6/10	680-59149-2	REG	68059149	SM3500-FeD	Ferrous Iron	32	HF	J	HTG	mg/L
MW-18 7/6/10	680-59149-3	REG	68059149	SM3500-FeD	Ferrous Iron	630	HF	J	HTG	mg/L
B-2 7/6/10	C0G070469007	REG	C0G070469	SW8081	Endrin	0.0062	U	UJ	CCV	ug/L
MW-108 7/6/10	C0G070469006	REG	C0G070469	SW8081	Endrin	0.0025	U	UJ	CCV	ug/L
MW-110 7/6/10	C0G070469004	REG	C0G070469	SW8081	Endrin	0.0012	U	UJ	CCV	ug/L
MW-110 7/6/10 DUP	C0G070469008	FD	C0G070469	SW8081	Endrin	0.0025	U	UJ	CCV	ug/L
MW-16 7/6/10	C0G070469001	REG	C0G070469	SW8081	Endrin	0.13	U	UJ	CCV	ug/L

prepared by WGC
reviewed by CSR
9/2/2010

TABLE 2 - VALIDATION ACTION SUMMARY
DATA VALIDATION SUMMARY REPORT
JULY 2010 GROUNDWATER SAMPLES
HONEYWELL - CLAYMONT
CLAYMONT, DELAWARE

MW-18 7/6/10	C0G070469003	REG	C0G070469	SW8081	Endrin	2.5	U	UJ	CCV	ug/L
MW-17 7/6/10	C0G070469002	REG	C0G070469	SW8081	Endrin	0.0066	U	UJL	CCV, SSL	ug/L
MW-110 7/6/10	C0G070469004	REG	C0G070469	SW8081	Aldrin	0.0018	PG	J	CFP	ug/L
B-2 7/6/10	C0G070469007	REG	C0G070469	SW8081	alpha-BHC	0.031	PG	J	CFP	ug/L
MW-108 7/6/10	C0G070469006	REG	C0G070469	SW8081	alpha-BHC	0.025	PG	J	CFP	ug/L
B-2 7/6/10	C0G070469007	REG	C0G070469	SW8081	beta-BHC	0.0062	PG	J	CFP	ug/L
B-2 7/6/10	C0G070469007	REG	C0G070469	SW8081	delta-BHC	0.0091	PG	J	CFP	ug/L
MW-108 7/6/10	C0G070469006	REG	C0G070469	SW8081	delta-BHC	0.0055	PG	J	CFP	ug/L
B-2 7/6/10	C0G070469007	REG	C0G070469	SW8081	gamma-BHC (Lindane)	0.01	PG	J	CFP	ug/L
MW-108 7/6/10	C0G070469006	REG	C0G070469	SW8081	Heptachlor	0.0027	PG	J	CFP	ug/L
MW-108 7/6/10	C0G070469006	REG	C0G070469	SW8081	Methoxychlor	0.0031	JPG	J	CFP	ug/L
MW-110 7/6/10	C0G070469004	REG	C0G070469	SW8081	alpha-BHC	0.035		J	FD	ug/L
MW-110 7/6/10 DUP	C0G070469008	FD	C0G070469	SW8081	alpha-BHC	0.014		J	FD	ug/L
MW-110 7/6/10	C0G070469004	REG	C0G070469	SW8081	beta-BHC	0.015		J	FD	ug/L
MW-110 7/6/10	C0G070469004	REG	C0G070469	SW8081	delta-BHC	0.0082	PG	J	FD	ug/L
MW-110 7/6/10	C0G070469004	REG	C0G070469	SW8081	gamma-Chlordane	0.01		J	FD	ug/L
MW-110 7/6/10 DUP	C0G070469008	FD	C0G070469	SW8081	gamma-Chlordane	0.063		J	FD	ug/L
MW-110 7/6/10 DUP	C0G070469008	FD	C0G070469	SW8081	beta-BHC	0.0043	PG	J	FD, CFP	ug/L
MW-110 7/6/10 DUP	C0G070469008	FD	C0G070469	SW8081	delta-BHC	0.0022	JPG	J	FD, CFP	ug/L
MW-110 7/6/10	C0G070469004	REG	C0G070469	SW8081	gamma-BHC (Lindane)	0.0045	PG	J	FD, CFP	ug/L
MW-110 7/6/10 DUP	C0G070469008	FD	C0G070469	SW8081	gamma-BHC (Lindane)	0.0027	PG	J	FD, CFP	ug/L
MW-17 7/6/10	C0G070469002	REG	C0G070469	SW8081	4,4'-DDD	0.14		L	SSL	ug/L
MW-17 7/6/10	C0G070469002	REG	C0G070469	SW8081	4,4'-DDE	0.025		L	SSL	ug/L
MW-17 7/6/10	C0G070469002	REG	C0G070469	SW8081	4,4'-DDT	0.0066	U	UL	SSL	ug/L
MW-17 7/6/10	C0G070469002	REG	C0G070469	SW8081	Aldrin	0.0066	U	UL	SSL	ug/L
MW-17 7/6/10	C0G070469002	REG	C0G070469	SW8081	alpha-Chlordane	0.0066	U	UL	SSL	ug/L
MW-17 7/6/10	C0G070469002	REG	C0G070469	SW8081	beta-BHC	0.3		L	SSL	ug/L
MW-17 7/6/10	C0G070469002	REG	C0G070469	SW8081	Decachlorobiphenyl	0.013			SSL	ug/L
MW-17 7/6/10	C0G070469002	REG	C0G070469	SW8081	delta-BHC	0.0066	U	UL	SSL	ug/L
MW-17 7/6/10	C0G070469002	REG	C0G070469	SW8081	Dieldrin	0.0066	U	UL	SSL	ug/L
MW-17 7/6/10	C0G070469002	REG	C0G070469	SW8081	Endosulfan I	0.0066	U	UL	SSL	ug/L
MW-17 7/6/10	C0G070469002	REG	C0G070469	SW8081	Endosulfan II	0.0066	U	UL	SSL	ug/L
MW-17 7/6/10	C0G070469002	REG	C0G070469	SW8081	Endosulfan sulfate	0.0066	U	UL	SSL	ug/L
MW-17 7/6/10	C0G070469002	REG	C0G070469	SW8081	Endrin aldehyde	0.0066	U	UL	SSL	ug/L
MW-17 7/6/10	C0G070469002	REG	C0G070469	SW8081	Endrin ketone	0.0066	U	UL	SSL	ug/L
MW-17 7/6/10	C0G070469002	REG	C0G070469	SW8081	gamma-Chlordane	0.026		L	SSL	ug/L
MW-17 7/6/10	C0G070469002	REG	C0G070469	SW8081	Heptachlor	0.0066	U	UL	SSL	ug/L
MW-17 7/6/10	C0G070469002	REG	C0G070469	SW8081	Heptachlor epoxide	0.0066	U	UL	SSL	ug/L

TABLE 2 - VALIDATION ACTION SUMMARY
DATA VALIDATION SUMMARY REPORT
JULY 2010 GROUNDWATER SAMPLES
HONEYWELL - CLAYMONT
CLAYMONT, DELAWARE

MW-17 7/6/10	C0G070469002	REG	C0G070469	SW8081	Methoxychlor	0.013	U	UL	SSL	ug/L
MW-17 7/6/10	C0G070469002	REG	C0G070469	SW8081	Tetrachloro-m-xylene	0.011			SSL	ug/L
MW-17 7/6/10	C0G070469002	REG	C0G070469	SW8081	Toxaphene	0.51	U	UL	SSL	ug/L
MW-17 7/6/10	C0G070469002	REG	C0G070469	SW8081	alpha-BHC	0.088	PG	JL	SSL, CFP	ug/L
MW-17 7/6/10	C0G070469002	REG	C0G070469	SW8081	gamma-BHC (Lindane)	0.042	PG	JL	SSL, CFP	ug/L
MW-109 7/6/10	C0G070469005	REG	C0G070469	SW8081	4,4'-DDD	0.0062	U	R	SSR	ug/L
MW-109 7/6/10	C0G070469005	REG	C0G070469	SW8081	4,4'-DDE	0.0062	U	R	SSR	ug/L
MW-109 7/6/10	C0G070469005	REG	C0G070469	SW8081	4,4'-DDT	0.0062	U	R	SSR	ug/L
MW-109 7/6/10	C0G070469005	REG	C0G070469	SW8081	Aldrin	0.0062	U	R	SSR	ug/L
MW-109 7/6/10	C0G070469005	REG	C0G070469	SW8081	alpha-BHC	0.01		L	SSR	ug/L
MW-109 7/6/10	C0G070469005	REG	C0G070469	SW8081	alpha-Chlordane	0.0062	U	R	SSR	ug/L
MW-109 7/6/10	C0G070469005	REG	C0G070469	SW8081	beta-BHC	0.0062	U	R	SSR	ug/L
MW-109 7/6/10	C0G070469005	REG	C0G070469	SW8081	delta-BHC	0.0026	J	JL	SSR	ug/L
MW-109 7/6/10	C0G070469005	REG	C0G070469	SW8081	Dieldrin	0.0062	U	R	SSR	ug/L
MW-109 7/6/10	C0G070469005	REG	C0G070469	SW8081	Endosulfan I	0.0062	U	R	SSR	ug/L
MW-109 7/6/10	C0G070469005	REG	C0G070469	SW8081	Endosulfan II	0.0062	U	R	SSR	ug/L
MW-109 7/6/10	C0G070469005	REG	C0G070469	SW8081	Endosulfan sulfate	0.0062	U	R	SSR	ug/L
MW-109 7/6/10	C0G070469005	REG	C0G070469	SW8081	Endrin	0.0062	U	R	SSR	ug/L
MW-109 7/6/10	C0G070469005	REG	C0G070469	SW8081	Endrin aldehyde	0.0062	U	R	SSR	ug/L
MW-109 7/6/10	C0G070469005	REG	C0G070469	SW8081	Endrin ketone	0.0062	U	R	SSR	ug/L
MW-109 7/6/10	C0G070469005	REG	C0G070469	SW8081	gamma-BHC (Lindane)	0.0062	U	R	SSR	ug/L
MW-109 7/6/10	C0G070469005	REG	C0G070469	SW8081	gamma-Chlordane	0.0062	U	R	SSR	ug/L
MW-109 7/6/10	C0G070469005	REG	C0G070469	SW8081	Heptachlor	0.0062	U	R	SSR	ug/L
MW-109 7/6/10	C0G070469005	REG	C0G070469	SW8081	Heptachlor epoxide	0.0062	U	R	SSR	ug/L
MW-109 7/6/10	C0G070469005	REG	C0G070469	SW8081	Methoxychlor	0.012	U	R	SSR	ug/L
MW-109 7/6/10	C0G070469005	REG	C0G070469	SW8081	Toxaphene	0.48	U	R	SSR	ug/L

CCV	Continuing calibration verification outside limit
CFP	Confirmation dual column precision exceeded
FD	Field duplicate exceeds RPD criteria
HTA	Analytical Holding Time exceeded
HTG	Holding time for prep or analysis grossly exceeded
HTP	Preparation Holding Time exceeded
MSL	Matrix spike recovery criteria less than the lower limit
SSL	Surrogate recovery less than lower control limit
SSR	Surrogate spike recovery <10%

TABLE 3 - FINAL RESULTS
DATA VALIDATION SUMMARY REPORT
JULY 2010 GROUNDWATER SAMPLES
HONEYWELL - CLAYMONT
CLAYMONT, DELAWARE

		Field Sample ID	B-2 7/6/10		MW-108 7/6/10	
		Location	B-2		MW-108	
		Sample Date	7/6/2010		7/6/2010	
Units	Method	Parameter Name				
mg/L	E300.0	Chloride	60.2		34.4	
mg/L	E300.0	Nitrate as N	0.25	U	0.093	J
mg/L	E300.0	Nitrite as N	0.25	U	0.25	U
mg/L	E300.0	Sulfate	1600	L	1480	L
mg/L	SM5310C	Total Organic Carbon	7		7.9	
mg/L	TDS	Total Dissolved Solids	2740		2330	
ug/L	SW6020A	Arsenic	8300		30200	
ug/L	SW6020A	Arsenic-dissolved	8260	J	28600	J
ug/L	SW6020A	Iron	132000		147000	
ug/L	SW6020A	Lead	112		255	
ug/L	SW6020A	Lead-dissolved	0.38	J	12.5	
ug/L	SW8081	4,4'-DDD	0.0062	U	0.0025	U
ug/L	SW8081	4,4'-DDE	0.0062	U	0.0025	U
ug/L	SW8081	4,4'-DDT	0.0062	U	0.0025	U
ug/L	SW8081	Aldrin	0.0062	U	0.0025	U
ug/L	SW8081	alpha-BHC	0.031	J	0.025	J
ug/L	SW8081	alpha-Chlordane	0.0062	U	0.0025	U
ug/L	SW8081	beta-BHC	0.0062	J	0.0094	
ug/L	SW8081	delta-BHC	0.0091	J	0.0055	J
ug/L	SW8081	Dieldrin	0.0062	U	0.0025	U
ug/L	SW8081	Endosulfan I	0.0062	U	0.0025	U
ug/L	SW8081	Endosulfan II	0.0062	U	0.0025	U
ug/L	SW8081	Endosulfan sulfate	0.0062	U	0.0025	U
ug/L	SW8081	Endrin	0.0062	UJ	0.0025	UJ
ug/L	SW8081	Endrin aldehyde	0.0062	U	0.0025	U
ug/L	SW8081	Endrin ketone	0.0062	U	0.0025	U
ug/L	SW8081	gamma-BHC (Lindane)	0.01	J	0.047	
ug/L	SW8081	gamma-Chlordane	0.018		0.021	
ug/L	SW8081	Heptachlor	0.0062	U	0.0027	J
ug/L	SW8081	Heptachlor epoxide	0.0062	U	0.0025	U
ug/L	SW8081	Methoxychlor	0.012	U	0.0031	J
ug/L	SW8081	Toxaphene	0.48	U	0.19	U

TABLE 3 - FINAL RESULTS
DATA VALIDATION SUMMARY REPORT
JULY 2010 GROUNDWATER SAMPLES
HONEYWELL - CLAYMONT
CLAYMONT, DELAWARE

		Field Sample ID	MW-109 7/6/10		MW-110 7/6/10	
		Location	MW-109		MW-110	
		Sample Date	7/6/2010		7/6/2010	
Units	Method	Parameter Name				
mg/L	E300.0	Chloride	65.3		104	
mg/L	E300.0	Nitrate as N	0.25	U	0.25	U
mg/L	E300.0	Nitrite as N	0.22		0.25	U
mg/L	E300.0	Sulfate	954	L	1510	L
mg/L	SM5310C	Total Organic Carbon	5.6		2.4	
mg/L	TDS	Total Dissolved Solids	2080		2640	
ug/L	SW6020A	Arsenic	4130		2350	
ug/L	SW6020A	Arsenic-dissolved	3820	J	1540	J
ug/L	SW6020A	Iron	21200		18200	
ug/L	SW6020A	Lead	2.1	J	104	
ug/L	SW6020A	Lead-dissolved	5	U	4.8	J
ug/L	SW8081	4,4'-DDD	0.0062	R	0.0012	U
ug/L	SW8081	4,4'-DDE	0.0062	R	0.0012	U
ug/L	SW8081	4,4'-DDT	0.0062	R	0.0012	U
ug/L	SW8081	Aldrin	0.0062	R	0.0018	J
ug/L	SW8081	alpha-BHC	0.01	L	0.035	J
ug/L	SW8081	alpha-Chlordane	0.0062	R	0.0012	U
ug/L	SW8081	beta-BHC	0.0062	R	0.015	J
ug/L	SW8081	delta-BHC	0.0026	JL	0.0082	J
ug/L	SW8081	Dieldrin	0.0062	R	0.0012	U
ug/L	SW8081	Endosulfan I	0.0062	R	0.0012	U
ug/L	SW8081	Endosulfan II	0.0062	R	0.0012	U
ug/L	SW8081	Endosulfan sulfate	0.0062	R	0.0012	U
ug/L	SW8081	Endrin	0.0062	R	0.0012	UJ
ug/L	SW8081	Endrin aldehyde	0.0062	R	0.0012	U
ug/L	SW8081	Endrin ketone	0.0062	R	0.0012	U
ug/L	SW8081	gamma-BHC (Lindane)	0.0062	R	0.0045	J
ug/L	SW8081	gamma-Chlordane	0.0062	R	0.01	J
ug/L	SW8081	Heptachlor	0.0062	R	0.0012	U
ug/L	SW8081	Heptachlor epoxide	0.0062	R	0.0041	
ug/L	SW8081	Methoxychlor	0.012	R	0.0024	U
ug/L	SW8081	Toxaphene	0.48	R	0.095	U

TABLE 3 - FINAL RESULTS
DATA VALIDATION SUMMARY REPORT
JULY 2010 GROUNDWATER SAMPLES
HONEYWELL - CLAYMONT
CLAYMONT, DELAWARE

		Field Sample ID	MW-110 7/6/10 Dup		MW-16 7/6/10	
		Location	MW-110		MW-16	
		Sample Date	7/6/2010		7/6/2010	
Units	**Method**	**Parameter Name**				
mg/L	E300.0	Chloride	104		41.6	
mg/L	E300.0	Nitrate as N	0.1	J	0.12	J
mg/L	E300.0	Nitrite as N	0.25	U	0.25	U
mg/L	E300.0	Sulfate	1430	L	2870	L
mg/L	SM5310C	Total Organic Carbon	2.5		6.9	
mg/L	TDS	Total Dissolved Solids	2620		3320	
ug/L	SW6020A	Arsenic	2180		1220	
ug/L	SW6020A	Arsenic-dissolved	1400	J	63.2	J
ug/L	SW6020A	Iron	16400		161000	
ug/L	SW6020A	Lead	69.1		14.8	
ug/L	SW6020A	Lead-dissolved	5	U	5	U
ug/L	SW8081	4,4'-DDD	0.0025	U	0.13	U
ug/L	SW8081	4,4'-DDE	0.0025	U	0.13	U
ug/L	SW8081	4,4'-DDT	0.0025	U	0.13	U
ug/L	SW8081	Aldrin	0.0025	UJ	0.13	U
ug/L	SW8081	alpha-BHC	0.014	J	0.4	
ug/L	SW8081	alpha-Chlordane	0.0025	U	0.13	U
ug/L	SW8081	beta-BHC	0.0043	J	0.13	U
ug/L	SW8081	delta-BHC	0.0022	J	0.54	
ug/L	SW8081	Dieldrin	0.0025	U	0.13	U
ug/L	SW8081	Endosulfan I	0.0025	U	0.13	U
ug/L	SW8081	Endosulfan II	0.0025	U	0.13	U
ug/L	SW8081	Endosulfan sulfate	0.0025	U	0.13	U
ug/L	SW8081	Endrin	0.0025	UJ	0.13	UJ
ug/L	SW8081	Endrin aldehyde	0.0025	U	0.13	U
ug/L	SW8081	Endrin ketone	0.0025	U	0.13	U
ug/L	SW8081	gamma-BHC (Lindane)	0.0027	J	0.13	U
ug/L	SW8081	gamma-Chlordane	0.063	J	0.13	U
ug/L	SW8081	Heptachlor	0.0025	U	0.13	U
ug/L	SW8081	Heptachlor epoxide	0.0025	U	0.13	U
ug/L	SW8081	Methoxychlor	0.0048	U	0.24	U
ug/L	SW8081	Toxaphene	0.19	U	9.8	U

TABLE 3 - FINAL RESULTS
DATA VALIDATION SUMMARY REPORT
JULY 2010 GROUNDWATER SAMPLES
HONEYWELL - CLAYMONT
CLAYMONT, DELAWARE

		Field Sample ID	MW-17 7/6/10		MW-18 7/6/10	
		Location	MW-17		MW-18	
		Sample Date	7/6/2010		7/6/2010	
Units	Method	Parameter Name				
mg/L	E300.0	Chloride	20.1		19.8	
mg/L	E300.0	Nitrate as N	0.09	J	0.25	U
mg/L	E300.0	Nitrite as N	0.25	U	0.25	U
mg/L	E300.0	Sulfate	3790	L	3520	L
mg/L	SM5310C	Total Organic Carbon	4.1		5.1	
mg/L	TDS	Total Dissolved Solids	3530		4770	
ug/L	SW6020A	Arsenic	9.9		9690	
ug/L	SW6020A	Arsenic-dissolved	5	U	5070	J
ug/L	SW6020A	Iron	31300		558000	
ug/L	SW6020A	Lead	4.4	J	56.4	
ug/L	SW6020A	Lead-dissolved	5	U	1.2	J
ug/L	SW8081	4,4'-DDD	0.14	L	2.5	U
ug/L	SW8081	4,4'-DDE	0.025	L	2.5	U
ug/L	SW8081	4,4'-DDT	0.0066	UL	2.5	U
ug/L	SW8081	Aldrin	0.0066	UL	2.5	U
ug/L	SW8081	alpha-BHC	0.088	JL	52	
ug/L	SW8081	alpha-Chlordane	0.0066	UL	2.5	U
ug/L	SW8081	beta-BHC	0.3	L	5.5	
ug/L	SW8081	delta-BHC	0.0066	UL	20	
ug/L	SW8081	Dieldrin	0.0066	UL	2.5	U
ug/L	SW8081	Endosulfan I	0.0066	UL	2.5	U
ug/L	SW8081	Endosulfan II	0.0066	UL	2.5	U
ug/L	SW8081	Endosulfan sulfate	0.0066	UL	2.5	U
ug/L	SW8081	Endrin	0.0066	UJL	2.5	UJ
ug/L	SW8081	Endrin aldehyde	0.0066	UL	2.5	U
ug/L	SW8081	Endrin ketone	0.0066	UL	2.5	U
ug/L	SW8081	gamma-BHC (Lindane)	0.042	JL	2.5	U
ug/L	SW8081	gamma-Chlordane	0.026	L	2.5	U
ug/L	SW8081	Heptachlor	0.0066	UL	2.5	U
ug/L	SW8081	Heptachlor epoxide	0.0066	UL	2.5	U
ug/L	SW8081	Methoxychlor	0.013	UL	4.8	U
ug/L	SW8081	Toxaphene	0.51	UL	190	U

TABLE 3 - FINAL RESULTS
DATA VALIDATION SUMMARY REPORT
JULY 2010 GROUNDWATER SAMPLES
HONEYWELL - CLAYMONT
CLAYMONT, DELAWARE

		Field Sample ID	B-2 7/6/10	MW-108 7/6/10	MW-109 7/6/10	MW-110 7/6/10	MW-110 7/6/10 Dup
		Location	B-2	MW-108	MW-109	MW-110	MW-110
		Sample Date	7/6/2010	7/6/2010	7/6/2010	7/6/2010	7/6/2010
Units	**Method**	**Parameter Name**					
mg/L	E365.4	Phosphorus, Total	94	32	15	1.2	1.3
mg/L	E376.1	Sulfide	1 U	2.8	1 U	1 U	1 U
mg/L	E377.1	Sulfite	5 UJ	5 UJ	5 UJ	5 UJ	5 UJ
mg/L	SM3500-FeD	Ferric Iron	0.1 UJ	0.1 UJ	1 J	0.1 UJ	0.1 UJ
mg/L	SM3500-FeD	Ferrous Iron	150 J	170 J	23 J	19 J	19 J
ug/L	SW6010	Iron	140000	170000	24000	19000	18000

TABLE 3 - FINAL RESULTS
DATA VALIDATION SUMMARY REPORT
JULY 2010 GROUNDWATER SAMPLES
HONEYWELL - CLAYMONT
CLAYMONT, DELAWARE

		Field Sample ID	MW-16 7/6/10	MW-17 7/6/10	MW-18 7/6/10
		Location	MW-16	MW-17	MW-18
		Sample Date	7/6/2010	7/6/2010	7/6/2010
Units	**Method**	**Parameter Name**			
mg/L	E365.4	Phosphorus, Total	24	0.067 J	4.4
mg/L	E376.1	Sulfide	1 U	1 U	1 U
mg/L	E377.1	Sulfite	5 UJ	5 UJ	7.4 J
mg/L	SM3500-FeD	Ferric Iron	120 J	1 J	0.1 UJ
mg/L	SM3500-FeD	Ferrous Iron	38 J	32 J	630 J
ug/L	SW6010	Iron	160000	33000	570000

DATA VALIDATION SUMMARY REPORT
JULY 2010 SEDIMENT AND SOIL SAMPLES
HONEYWELL – CLAYMONT
CLAYMONT, DELAWARE

1.0 INTRODUCTION

Data validation was completed on twenty sediment and seventeen soil samples collected by MACTEC in July, 2010. A summary of samples included in this review is presented in Table 1. Samples were analyzed for pesticides, arsenic, lead, and total organic carbon by Test America located in Pittsburgh, Pennsylvania. The following U.S. Environmental Protection Agency (USEPA) SW846 analytical methods (USEPA, 1996; USEPA, 1986) and American Public Health Association (APHA) Standard Methods (APHA, 1998) were performed by Test America:

- Pesticides by USEPA Method 8081A
- Metals (Arsenic and Lead) by USEPA Method 6020A
- Total Organic Carbon by USEPA Lloyd Kahn
- Percent Solids by APHA Method SM 2540G

Data quality reviews were completed using general procedures described in Region III Modifications to National Functional Guidelines for Organic Data Review (1994), Region III Innovative Approaches for Validation of Organic and Inorganic Data – Standard Operating Procedures (1995), and Region III Modifications to the Laboratory Data Validation Functional Guidelines for Evaluating Inorganic Analysis (1993). Data qualifications were completed if necessary in accordance with the guidelines and professional judgment using the following qualifiers:

Inorganic Qualifiers:

B = Not detected substantially above the level reported in the laboratory blanks.
J = Analyte present. The reported value may not be accurate or precise.

Organic Qualifiers:

J = Analyte present. The reported value may not be accurate or precise.
U = Not detected. The associated number indicates approximate sample concentration necessary to be detected.

Result for non-detects were reported as U qualified results at the sample quantitation limits (QLs). Target analyte results that were detected at concentrations between the method detection limit (MDL) and QLs were reported as J qualified estimated values. A summary of data validation qualification actions is presented in Table 2. A summary of final sample results is presented in Table 3.

2.0 DATA VALIDATION ACTIONS AND OBSERVATIONS

All pesticide samples were analyzed at dilutions due to matrix or high concentrations of target compounds. Detection limits for target compounds that were not detected in samples are elevated due the dilution.

With the exception of the items discussed below, quality control (QC) parameters and measurements checked during validation met requirements in the analytical method and/or validation guidelines. Unless specified below, results are interpreted to be usable as reported by the laboratory.

2.1 Pesticides

An EPA Region III Level M2 data review was completed on the pesticide data reported in SDGs C0G090595 and C0G090598. The Region III M2 guidelines are applicable to pesticide data generated using Contract Laboratory Program Statement of Work (CLP SOW) methods (i.e. SOM01.2). USEPA SW-846 Method 8081 was used to analyze samples for this project. Some QC checks that are required using CLP methods but not required in Method 8081 including resolution check standards, instrument blanks, florisil cleanup, and GC/MS confirmation of detections were not completed by the lab, and data were not available for review.

Data were evaluated for the following M2 parameters:

* Collection and Preservation
* Holding Times
* Data Completeness
* Initial Calibration
* GPC Cleanup
* Continuing Calibration
* Blank Contamination
* Laboratory Control Samples (LCS)
* Matrix Spike/Matrix Spike Duplicate (MS/MSD)
  Field Duplicates
* Surrogate Recoveries
* Instrument Performance Checks (PEM)
  Target Compound Identification and Quantitation

* - all criteria were met for this parameter

Field Duplicates

The EPA Region III M2 validation guideline does not specify a relative percent difference (RPD) control limit for field duplicate samples. A project control limit of 50 was used when evaluating sediment and soil samples.

SDG C0G090595

A field duplicate (DUP-1) was collected with sediment sample SE-25. The RPD was calculated between the detections in the field sample and field duplicate and compared to a control limit of 50. The RPD for 4,4'-DDE was 63. The results for 4,4'-DDE were qualified estimated (J) in SE-25 and DUP-1.

SDG C0G090598

A field duplicate (DUP-1) was collected with soil sample SP-16. The RPD for 4,4'-DDT was 68. Results for 4,4'-DDT were qualified estimated (J) in SP-16 and DUP-1.

Target Compound Identification and Quantitation

SDG C0G090595 and C0G090598

The EPA Region III M2 validation guideline does not specify a dual column precision RPD limit between results reported from two chromatographic columns. The RPD control limit of 40 that is specified in SW-846 Method 8000B was used to evaluate results reported from the primary and confirmatory column. Sample results with analytes with confirmation column RPDs greater than 40 are listed below. Results for these analytes were estimated (J) in the final data set. The laboratory reported the lower concentration value for samples that had a RPD > 40. When the RPD was less than 40, the laboratory reported the higher result from the two columns.

Field Sample ID	Lab Sample ID	Analyte	RPD
SE-11 7/7/10	C0G090595001	4,4'-DDE	52
		delta-BHC	54
SE-12 7/7/10	C0G090595002	4,4'-DDE	104
		gamma-BHC (Lindane)	66
SE-13 7/7/10	C0G090595003	4,4'-DDE	73
		Aldrin	99
		alpha-BHC	51
		beta-BHC	155
SE-14 7/7/10	C0G090595004	4,4'-DDE	77
		alpha-BHC	76
		delta-BHC	111
		Endrin	58
SE-15 7/7/10	C0G090595005	4,4'-DDE	108
		delta-BHC	44
SE-16 7/7/10	C0G090595006	4,4'-DDE	111
SE-17 7/7/10	C0G090595007	4,4'-DDE	68
SE-18 7/7/10	C0G090595008	4,4'-DDE	101
SE-19 7/7/10	C0G090595009	delta-BHC	141
SE-20 7/7/10	C0G090595010	4,4'-DDE	59
		delta-BHC	97
SE-21 7/7/10	C0G090595011	4,4'-DDE	45
		Aldrin	41
		Endosulfan I	55
		Endosulfan II	76
		Endosulfan sulfate	65
		Endrin ketone	79
SE-22 7/7/10	C0G090595012	4,4'-DDE	49
SE-23 7/7/10	C0G090595013	Dieldrin	188
SE-26 7/7/10	C0G090595016	delta-BHC	60

SE-29 7/7/10	C0G090595019	beta-BHC	87

SDG C0G090598

Field Sample ID	Lab Sample ID	Parameter Name	RPD
SP-1 7/7/10	C0G090598001	Dieldrin	189
SP-10 7/7/10	C0G090598012	delta-BHC	139
		Endosulfan II	135
		Endosulfan sulfate	133
		Endrin ketone	67
SP-11 7/7/10	C0G090598010	alpha-BHC	107
		Dieldrin	101
		Endosulfan sulfate	90
		Endrin	79
		Endrin ketone	115
		gamma-Chlordane	130
		Heptachlor epoxide	46
SP-12 7/7/10	C0G090598011	delta-BHC	55
		Dieldrin	68
		Endrin	168
		gamma-BHC (Lindane)	65
SP-13 7/8/10	C0G090598014	Aldrin	89
		beta-BHC	40
		delta-BHC	94
		Dieldrin	173
		gamma-Chlordane	41
SP-14 7/8/10	C0G090598015	4,4'-DDE	50
		delta-BHC	80
		gamma-BHC (Lindane)	147
		Heptachlor	84
SP-16 7/8/10	C0G090598013	Dieldrin	53
		Endrin	138
SP-16 7/8/10 Dup	C0G090598017	Dieldrin	52
		Endosulfan sulfate	97
		Endrin ketone	45
		gamma-Chlordane	46
		Heptachlor	163
		Heptachlor epoxide	75
SP-5 7/7/10	C0G090598003	Dieldrin	184
SP-6 7/7/10	C0G090598009	beta-BHC	50

		gamma-Chlordane	40
SP-7 7/7/10	C0G090598008	alpha-Chlordane	178
		Endrin ketone	57
		gamma-Chlordane	50
		Heptachlor	93
SP-9 7/7/10	C0G090598007	Endosulfan sulfate	47

Sample Dilution

All samples were analyzed at dilutions due to the presence of 4,4'-DDT and associated 4,4'-DDD and 4,4'-DDE. The reporting limits for other pesticide target compounds in these samples were elevated based on the dilution factors below:

SDG C0G090595

Field Sample ID	Lab Sample ID	Analytical Method	Dilution Factor
SE-11 7/7/10	C0G090595001	SW8081	200
SE-12 7/7/10	C0G090595002	SW8081	19.93
SE-13 7/7/10	C0G090595003	SW8081	20
SE-14 7/7/10	C0G090595004	SW8081	19.87
SE-15 7/7/10	C0G090595005	SW8081	200
SE-16 7/7/10	C0G090595006	SW8081	100
SE-17 7/7/10	C0G090595007	SW8081	1000
SE-18 7/7/10	C0G090595008	SW8081	100
SE-19 7/7/10	C0G090595009	SW8081	9.9
SE-20 7/7/10	C0G090595010	SW8081	19.93
SE-21 7/7/10	C0G090595011	SW8081	20
SE-22 7/7/10	C0G090595012	SW8081	100
SE-23 7/7/10	C0G090595013	SW8081	200
SE-24 7/7/10	C0G090595014	SW8081	200
SE-25 7/7/10	C0G090595015	SW8081	990
SE-25 7/7/10 Dup	C0G090595020	SW8081	1000
SE-26 7/7/10	C0G090595016	SW8081	1000
SE-27 7/7/10	C0G090595017	SW8081	500000
SE-28 7/7/10	C0G090595018	SW8081	1000
SE-29 7/7/10	C0G090595019	SW8081	1000

SDG C0G090598

Field Sample ID	Lab Sample ID	Analytical Method	Dilution Factor
SP-1 7/7/10	C0G090598001	SW8081	10000
SP-2 7/7/10	C0G090598002	SW8081	1987
SP-3 7/7/10	C0G090598005	SW8081	990
SP-4 7/7/10	C0G090598004	SW8081	100
SP-5 7/7/10	C0G090598003	SW8081	200

SP-6 7/7/10	C0G090598009	SW8081	200
SP-7 7/7/10	C0G090598008	SW8081	200
SP-8 7/7/10	C0G090598006	SW8081	199
SP-9 7/7/10	C0G090598007	SW8081	10
SP-10 7/7/10	C0G090598012	SW8081	9.9
SP-11 7/7/10	C0G090598010	SW8081	10
SP-12 7/7/10	C0G090598011	SW8081	10
SP-13 7/8/10	C0G090598014	SW8081	20
SP-14 7/8/10	C0G090598015	SW8081	20
SP-15 7/8/10	C0G090598016	SW8081	100
SP-16 7/8/10	C0G090598013	SW8081	9.9
SP-16 7/8/10 Dup	C0G090598017	SW8081	3.97

2.2 Total Metals

An EPA Region III Level IM1 data review was completed on the arsenic and lead data reported in SDGs C0G090595 and C0G090598. The Region III IM1 guidelines is applicable to metals data obtained using Contract Laboratory Program Statement of Work (CLP SOW) methods (i.e. ILM05.3). Method SW-846 6020 was used to analyze samples that are included in this review and therefore some analytical QC samples (i.e. bracketing ICS standards) required using CLP methods were not analyzed. Samples were analyzed in accordance with Method 6020.

Data were evaluated for the following parameters:

* Collection and Preservation
* Holding Times
* Data Completeness
* Initial Calibration
* Continuing Calibration
  QC Blank Results
* Laboratory Control Samples (LCS)
* Matrix Spike/Matrix Spike Duplicate (MS/MSD)
* Field and Lab Duplicates
* Interference Check Samples
* Serial Dilutions
* Reporting Limit Verification

* - all criteria were met for this parameter

Blanks

SDG C0G090598

A low level detection of arsenic (0.19 µg/L) was reported in a continuing calibration blank analyzed with soil samples in SDG C0G090598. Samples with arsenic concentrations that were less than five times the concentration in the blank were qualified (B). The final results for arsenic were also qualified (J) because the reported concentrations were between the MDL and RL. The following samples were qualified (JB) indicating the potential that these detections represent lab contamination:

Field Sample ID	Lab Sample ID	Parameter Name	Lab Result	Lab Units	Final Qualifier
SP-10 7/7/10	C0G090598012	Arsenic	0.24	mg/kg	JB
SP-13 7/8/10	C0G090598014	Arsenic	0.44	mg/kg	JB

2.3 Total Organic Carbon (TOC)

A Honeywell Level II data validation was performed on TOC data.

Data were evaluated for the following parameters:

* Collection and Preservation
* Holding Times
* Data Completeness
* QC Blank Results
* Laboratory Control Samples
* Matrix Spike/Matrix Spike Duplicate (MS/MSD)
* Field Duplicates
* Laboratory Duplicates

* - all criteria were met for this parameter

2.4 Percent Solids

SDG C0G090595

The sediment samples reported in SDG C0G090595 had percent solid values that were less than 50 percent. A sub-set of samples had percent solid values that were less than 10 percent. No requirements for percent solids were identified in the EPA guidelines. Professional judgment was used and pesticide, metals and TOC results for samples with a percent solid value that was less than 10 percent were qualified as estimate (J/UJ).

Field Sample ID	Lab Sample ID	Percent Solid Value
SE-25 7/7/10	C0G090595015	4.5
SE-25 7/7/10 Dup	C0G090595020	5.1
SE-28 7/7/10	C0G090595018	6.5
SE-29 7/7/10	C0G090595019	7.3
SE-26 7/7/10	C0G090595016	9.6

References:

U.S. Environmental Protection Agency (USEPA), 1986. "Determination of Total Organic Carbon in Sediment; USEPA Region II Environmental Services Division; Monitoring Management Branch; Edison, New Jersey; Lloyd Kahn; July 1986.

U.S. Environmental Protection Agency (USEPA), Region III, 1993. "Region III Modifications to the Laboratory Data Validation Functional Guidelines for Evaluating Inorganic Analysis"; April 1993.

U.S. Environmental Protection Agency (USEPA), Region III, 1994. "Region III Modifications to National Functional Guidelines for Organic Data Review, Multi-Media, Multi-Concentration (OLM01.0-OLM01.9)"; Central Regional Laboratory Quality Assurance Branch; Annapolis, MD; September 1994.

U.S. Environmental Protection Agency (USEPA), Region III, 1995. "Innovative Approaches for Validation of Organic and Inorganic Data – Standard Operating Procedures; Analytical Services and Quality Assurance Branch; Annapolis, MD; June 1005.

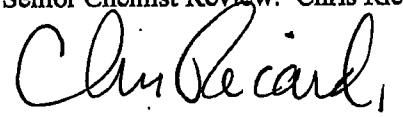
U.S. Environmental Protection Agency (USEPA), 1996. "Test Methods for Evaluating Solid Waste"; Laboratory Manual Physical/Chemical Methods; Office of Solid Waste and Emergency Response; Washington, DC; SW-846; Revision 4 -December 1996.

American Public Health Association (APHA), 1998. "Standard Methods for the Examination of Water and Wastewater," 20th Edition, 1998.

Data Validator: Tige Cunningham

August 31, 2010

Senior Chemist Review: Chris Ricardi, NRCC-EAC



September 2, 2010

TABLE 1
SUMMARY OF SAMPLES
DATA VALIDATION SUMMARY REPORT
JULY 2010 SEDIMENT AND SOIL SAMPLES
HONEYWELL – CLAYMONT
CLAYMONT, DELAWARE

			TOC	% Solids	Arsenic and Lead	Pesticides
Field Sample ID	QC Code	SDG	Lloyd Kahn	SM2540G	SW6020A	SW8081
SE-11	REG	C0G090595	1	1	2	23
SE-12	REG	C0G090595	1	1	2	23
SE-13	REG	C0G090595	1	1	2	23
SE-14	REG	C0G090595	1	1	2	23
SE-15	REG	C0G090595	1	1	2	23
SE-16	REG	C0G090595	1	1	2	23
SE-17	REG	C0G090595	1	1	2	23
SE-18	REG	C0G090595	1	1	2	23
SE-19	REG	C0G090595	1	1	2	23
SE-20	REG	C0G090595	1	1	2	23
SE-21	REG	C0G090595	1	1	2	23
SE-22	REG	C0G090595	1	1	2	23
SE-23	REG	C0G090595	1	1	2	23
SE-24	REG	C0G090595	1	1	2	23
SE-25	REG	C0G090595	1	1	2	23
SE-25 DUP-1	FD	C0G090595	1	1	2	23
SE-26	REG	C0G090595	1	1	2	23
SE-27	REG	C0G090595	1	1	2	23
SE-28	REG	C0G090595	1	1	2	23
SE-29	REG	C0G090595	1	1	2	23
SP-1	REG	C0G090598	1	1	2	23
SP-10	REG	C0G090598	1	1	2	23
SP-11	REG	C0G090598	1	1	2	23
SP-12	REG	C0G090598	1	1	2	23
SP-13	REG	C0G090598	1	1	2	23
SP-14	REG	C0G090598	1	1	2	23
SP-15	REG	C0G090598	1	1	2	23
SP-16	REG	C0G090598	1	1	2	23
SP-16 DUP-1	FD	C0G090598	1	1	2	23
SP-3	REG	C0G090598	1	1	2	23
SP-4	REG	C0G090598	1	1	2	23
SP-5	REG	C0G090598	1	1	2	23
SP-6	REG	C0G090598	1	1	2	23
SP-7	REG	C0G090598	1	1	2	23
SP-8	REG	C0G090598	1	1	2	23
SP-9	REG	C0G090598	1	1	2	23

Notes:
Number listed under method indicates number of target analytes reported.
FD = Field Duplicate REG = Field Sample
SDG = Sample Delivery Group

TABLE 2 - VALIDATION ACTION SUMMARY
DATA VALIDATION SUMMARY REPORT
JULY 2010 SEDIMENT AND SOIL SAMPLES
HONEYWELL – CLAYMONT
CLAYMONT, DELAWARE

Field Sample ID	Lab Sample ID	Type	SDG	Method	Dilution Factor	Parameter Name	Lab Result	Lab Qual	Val Qual	Reason Codes	Units
SE-25 7/7/10	C0G090595015	REG	C0G090595	Lloyd Kahn	1.82	TOC	93300		J	PM	mg/kg
SE-25 7/7/10 Dup	C0G090595020	FD	C0G090595	Lloyd Kahn	1.98	TOC	58500		J	PM	mg/kg
SE-26 7/7/10	C0G090595016	REG	C0G090595	Lloyd Kahn	2.11	TOC	58200		J	PM	mg/kg
SE-28 7/7/10	C0G090595018	REG	C0G090595	Lloyd Kahn	2.08	TOC	80100		J	PM	mg/kg
SE-29 7/7/10	C0G090595019	REG	C0G090595	Lloyd Kahn	1.98	TOC	20000	B	J	PM	mg/kg
SE-25 7/7/10	C0G090595015	REG	C0G090595	SW6020A	5	Arsenic	944		J	PM	mg/kg
SE-25 7/7/10	C0G090595015	REG	C0G090595	SW6020A	5	Lead	260	J	J	PM	mg/kg
SE-25 7/7/10 Dup	C0G090595020	FD	C0G090595	SW6020A	5	Arsenic	741		J	PM	mg/kg
SE-25 7/7/10 Dup	C0G090595020	FD	C0G090595	SW6020A	5	Lead	190	J	J	PM	mg/kg
SE-26 7/7/10	C0G090595016	REG	C0G090595	SW6020A	5	Arsenic	960		J	PM	mg/kg
SE-26 7/7/10	C0G090595016	REG	C0G090595	SW6020A	5	Lead	738	J	J	PM	mg/kg
SE-28 7/7/10	C0G090595018	REG	C0G090595	SW6020A	5	Arsenic	785		J	PM	mg/kg
SE-28 7/7/10	C0G090595018	REG	C0G090595	SW6020A	5	Lead	282	J	J	PM	mg/kg
SE-29 7/7/10	C0G090595019	REG	C0G090595	SW6020A	5	Arsenic	1010		J	PM	mg/kg
SE-29 7/7/10	C0G090595019	REG	C0G090595	SW6020A	5	Lead	2020	J	J	PM	mg/kg
SP-10 7/7/10	C0G090598012	REG	C0G090598	SW6020A	5	Arsenic	0.24	B	JB	BL1	mg/kg
SP-13 7/8/10	C0G090598014	REG	C0G090598	SW6020A	5	Arsenic	0.44	B	JB	BL1	mg/kg
SE-11 7/7/10	C0G090595001	REG	C0G090595	SW8081	200	4,4'-DDE	280	PG	J	CFP	ug/kg
SE-11 7/7/10	C0G090595001	REG	C0G090595	SW8081	200	delta-BHC	9.4	JPG	J	CFP	ug/kg
SE-12 7/7/10	C0G090595002	REG	C0G090595	SW8081	19.93	4,4'-DDE	30	PG	J	CFP	ug/kg
SE-12 7/7/10	C0G090595002	REG	C0G090595	SW8081	19.93	gamma-BHC (Lindane)	0.91	JPG	J	CFP	ug/kg
SE-13 7/7/10	C0G090595003	REG	C0G090595	SW8081	20	4,4'-DDE	17	PG	J	CFP	ug/kg
SE-13 7/7/10	C0G090595003	REG	C0G090595	SW8081	20	Aldrin	1.8	JPG	J	CFP	ug/kg
SE-13 7/7/10	C0G090595003	REG	C0G090595	SW8081	20	alpha-BHC	1	JPG	J	CFP	ug/kg
SE-13 7/7/10	C0G090595003	REG	C0G090595	SW8081	20	beta-BHC	3.6	JPG	J	CFP	ug/kg
SE-14 7/7/10	C0G090595004	REG	C0G090595	SW8081	19.87	4,4'-DDE	34	PG	J	CFP	ug/kg
SE-14 7/7/10	C0G090595004	REG	C0G090595	SW8081	19.87	alpha-BHC	0.79	JPG	J	CFP	ug/kg
SE-14 7/7/10	C0G090595004	REG	C0G090595	SW8081	19.87	delta-BHC	1.3	JPG	J	CFP	ug/kg
SE-14 7/7/10	C0G090595004	REG	C0G090595	SW8081	19.87	Endrin	1.6	JPG	J	CFP	ug/kg
SE-15 7/7/10	C0G090595005	REG	C0G090595	SW8081	200	4,4'-DDE	36	JPG	J	CFP	ug/kg
SE-15 7/7/10	C0G090595005	REG	C0G090595	SW8081	200	delta-BHC	9.5	JPG	J	CFP	ug/kg
SE-16 7/7/10	C0G090595006	REG	C0G090595	SW8081	100	4,4'-DDE	64	PG	J	CFP	ug/kg
SE-17 7/7/10	C0G090595007	REG	C0G090595	SW8081	1000	4,4'-DDE	180	PG	J	CFP	ug/kg
SE-18 7/7/10	C0G090595008	REG	C0G090595	SW8081	100	4,4'-DDE	38	PG	J	CFP	ug/kg
SE-19 7/7/10	C0G090595009	REG	C0G090595	SW8081	9.9	delta-BHC	0.59	JPG	J	CFP	ug/kg
SE-20 7/7/10	C0G090595010	REG	C0G090595	SW8081	19.93	4,4'-DDE	13	PG	J	CFP	ug/kg

TABLE 2 - VALIDATION ACTION SUMMARY
DATA VALIDATION SUMMARY REPORT
JULY 2010 SEDIMENT AND SOIL SAMPLES
HONEYWELL – CLAYMONT
CLAYMONT, DELAWARE

Field Sample ID	Lab Sample ID	Type	SDG	Method	Dilution Factor	Parameter Name	Lab Result	Lab Qual	Val Qual	Reason Codes	Units
SE-20 7/7/10	C0G090595010	REG	C0G090595	SW8081	19.93	delta-BHC	0.64	JPG	J	CFP	ug/kg
SE-21 7/7/10	C0G090595011	REG	C0G090595	SW8081	20	4,4'-DDE	220	PG	J	CFP	ug/kg
SE-21 7/7/10	C0G090595011	REG	C0G090595	SW8081	20	Aldrin	6.1	PG	J	CFP	ug/kg
SE-21 7/7/10	C0G090595011	REG	C0G090595	SW8081	20	Endosulfan I	2.1	JPG	J	CFP	ug/kg
SE-21 7/7/10	C0G090595011	REG	C0G090595	SW8081	20	Endosulfan II	2.1	JPG	J	CFP	ug/kg
SE-21 7/7/10	C0G090595011	REG	C0G090595	SW8081	20	Endosulfan sulfate	2.6	JPG	J	CFP	ug/kg
SE-21 7/7/10	C0G090595011	REG	C0G090595	SW8081	20	Endrin ketone	4.3	PG	J	CFP	ug/kg
SE-22 7/7/10	C0G090595012	REG	C0G090595	SW8081	100	4,4'-DDE	55	PG	J	CFP	ug/kg
SE-23 7/7/10	C0G090595013	REG	C0G090595	SW8081	200	Dieldrin	7.8	JPG	J	CFP	ug/kg
SE-26 7/7/10	C0G090595016	REG	C0G090595	SW8081	1000	delta-BHC	170	JPG	J	CFP,PM	ug/kg
SE-29 7/7/10	C0G090595019	REG	C0G090595	SW8081	1000	beta-BHC	320	JPG	J	CFP,PM	ug/kg
SE-25 7/7/10	C0G090595015	REG	C0G090595	SW8081	990	4,4'-DDE	8700		J	FD,PM	ug/kg
SE-25 7/7/10 Dup	C0G090595020	FD	C0G090595	SW8081	1000	4,4'-DDE	4500		J	FD,PM	ug/kg
SE-25 7/7/10	C0G090595015	REG	C0G090595	SW8081	990	4,4'-DDD	68000		J	PM	ug/kg
SE-25 7/7/10	C0G090595015	REG	C0G090595	SW8081	990	4,4'-DDT	140000		J	PM	ug/kg
SE-25 7/7/10	C0G090595015	REG	C0G090595	SW8081	990	Aldrin	1800	U	UJ	PM	ug/kg
SE-25 7/7/10	C0G090595015	REG	C0G090595	SW8081	990	alpha-BHC	350	J	J	PM	ug/kg
SE-25 7/7/10	C0G090595015	REG	C0G090595	SW8081	990	alpha-Chlordane	1800	U	UJ	PM	ug/kg
SE-25 7/7/10	C0G090595015	REG	C0G090595	SW8081	990	beta-BHC	1800	U	UJ	PM	ug/kg
SE-25 7/7/10	C0G090595015	REG	C0G090595	SW8081	990	delta-BHC	1800	U	UJ	PM	ug/kg
SE-25 7/7/10	C0G090595015	REG	C0G090595	SW8081	990	Dieldrin	1800	U	UJ	PM	ug/kg
SE-25 7/7/10	C0G090595015	REG	C0G090595	SW8081	990	Endosulfan I	1800	U	UJ	PM	ug/kg
SE-25 7/7/10	C0G090595015	REG	C0G090595	SW8081	990	Endosulfan II	1800	U	UJ	PM	ug/kg
SE-25 7/7/10	C0G090595015	REG	C0G090595	SW8081	990	Endosulfan sulfate	1800	U	UJ	PM	ug/kg
SE-25 7/7/10	C0G090595015	REG	C0G090595	SW8081	990	Endrin	1800	U	UJ	PM	ug/kg
SE-25 7/7/10	C0G090595015	REG	C0G090595	SW8081	990	Endrin aldehyde	1800	U	UJ	PM	ug/kg
SE-25 7/7/10	C0G090595015	REG	C0G090595	SW8081	990	Endrin ketone	1800	U	UJ	PM	ug/kg
SE-25 7/7/10	C0G090595015	REG	C0G090595	SW8081	990	gamma-BHC (Lindane)	1800	U	UJ	PM	ug/kg
SE-25 7/7/10	C0G090595015	REG	C0G090595	SW8081	990	gamma-Chlordane	1800	U	UJ	PM	ug/kg
SE-25 7/7/10	C0G090595015	REG	C0G090595	SW8081	990	Heptachlor	1800	U	UJ	PM	ug/kg
SE-25 7/7/10	C0G090595015	REG	C0G090595	SW8081	990	Heptachlor epoxide	1800	U	UJ	PM	ug/kg
SE-25 7/7/10	C0G090595015	REG	C0G090595	SW8081	990	Methoxychlor	3600	U	UJ	PM	ug/kg
SE-25 7/7/10	C0G090595015	REG	C0G090595	SW8081	990	Toxaphene	73000	U	UJ	PM	ug/kg
SE-25 7/7/10 Dup	C0G090595020	FD	C0G090595	SW8081	1000	4,4'-DDD	56000		J	PM	ug/kg
SE-25 7/7/10 Dup	C0G090595020	FD	C0G090595	SW8081	1000	4,4'-DDT	89000		J	PM	ug/kg
SE-25 7/7/10 Dup	C0G090595020	FD	C0G090595	SW8081	1000	Aldrin	1600	U	UJ	PM	ug/kg

TABLE 2 - VALIDATION ACTION SUMMARY
DATA VALIDATION SUMMARY REPORT
JULY 2010 SEDIMENT AND SOIL SAMPLES
HONEYWELL – CLAYMONT
CLAYMONT, DELAWARE

Field Sample ID	Lab Sample ID	Type	SDG	Method	Dilution Factor	Parameter Name	Lab Result	Lab Qual	Val Qual	Reason Codes	Units
SE-25 7/7/10 Dup	C0G090595020	FD	C0G090595	SW8081	1000	alpha-BHC	300	J	J	PM	ug/kg
SE-25 7/7/10 Dup	C0G090595020	FD	C0G090595	SW8081	1000	alpha-Chlordane	1600	U	UJ	PM	ug/kg
SE-25 7/7/10 Dup	C0G090595020	FD	C0G090595	SW8081	1000	beta-BHC	1600	U	UJ	PM	ug/kg
SE-25 7/7/10 Dup	C0G090595020	FD	C0G090595	SW8081	1000	delta-BHC	1600	U	UJ	PM	ug/kg
SE-25 7/7/10 Dup	C0G090595020	FD	C0G090595	SW8081	1000	Dieldrin	1600	U	UJ	PM	ug/kg
SE-25 7/7/10 Dup	C0G090595020	FD	C0G090595	SW8081	1000	Endosulfan I	1600	U	UJ	PM	ug/kg
SE-25 7/7/10 Dup	C0G090595020	FD	C0G090595	SW8081	1000	Endosulfan II	1600	U	UJ	PM	ug/kg
SE-25 7/7/10 Dup	C0G090595020	FD	C0G090595	SW8081	1000	Endosulfan sulfate	1600	U	UJ	PM	ug/kg
SE-25 7/7/10 Dup	C0G090595020	FD	C0G090595	SW8081	1000	Endrin	1600	U	UJ	PM	ug/kg
SE-25 7/7/10 Dup	C0G090595020	FD	C0G090595	SW8081	1000	Endrin aldehyde	1600	U	UJ	PM	ug/kg
SE-25 7/7/10 Dup	C0G090595020	FD	C0G090595	SW8081	1000	Endrin ketone	1600	U	UJ	PM	ug/kg
SE-25 7/7/10 Dup	C0G090595020	FD	C0G090595	SW8081	1000	gamma-BHC (Lindane)	1600	U	UJ	PM	ug/kg
SE-25 7/7/10 Dup	C0G090595020	FD	C0G090595	SW8081	1000	gamma-Chlordane	1600	U	UJ	PM	ug/kg
SE-25 7/7/10 Dup	C0G090595020	FD	C0G090595	SW8081	1000	Heptachlor	1600	U	UJ	PM	ug/kg
SE-25 7/7/10 Dup	C0G090595020	FD	C0G090595	SW8081	1000	Heptachlor epoxide	1600	U	UJ	PM	ug/kg
SE-25 7/7/10 Dup	C0G090595020	FD	C0G090595	SW8081	1000	Methoxychlor	3200	U	UJ	PM	ug/kg
SE-25 7/7/10 Dup	C0G090595020	FD	C0G090595	SW8081	1000	Toxaphene	65000	U	UJ	PM	ug/kg
SE-26 7/7/10	C0G090595016	REG	C0G090595	SW8081	1000	4,4'-DDD	66000		J	PM	ug/kg
SE-26 7/7/10	C0G090595016	REG	C0G090595	SW8081	1000	4,4'-DDE	5800		J	PM	ug/kg
SE-26 7/7/10	C0G090595016	REG	C0G090595	SW8081	1000	4,4'-DDT	32000		J	PM	ug/kg
SE-26 7/7/10	C0G090595016	REG	C0G090595	SW8081	1000	Aldrin	870	U	UJ	PM	ug/kg
SE-26 7/7/10	C0G090595016	REG	C0G090595	SW8081	1000	alpha-BHC	350	J	J	PM	ug/kg
SE-26 7/7/10	C0G090595016	REG	C0G090595	SW8081	1000	alpha-Chlordane	870	U	UJ	PM	ug/kg
SE-26 7/7/10	C0G090595016	REG	C0G090595	SW8081	1000	beta-BHC	870	U	UJ	PM	ug/kg
SE-26 7/7/10	C0G090595016	REG	C0G090595	SW8081	1000	Dieldrin	870	U	UJ	PM	ug/kg
SE-26 7/7/10	C0G090595016	REG	C0G090595	SW8081	1000	Endosulfan I	870	U	UJ	PM	ug/kg
SE-26 7/7/10	C0G090595016	REG	C0G090595	SW8081	1000	Endosulfan II	870	U	UJ	PM	ug/kg
SE-26 7/7/10	C0G090595016	REG	C0G090595	SW8081	1000	Endosulfan sulfate	870	U	UJ	PM	ug/kg
SE-26 7/7/10	C0G090595016	REG	C0G090595	SW8081	1000	Endrin	870	U	UJ	PM	ug/kg
SE-26 7/7/10	C0G090595016	REG	C0G090595	SW8081	1000	Endrin aldehyde	870	U	UJ	PM	ug/kg
SE-26 7/7/10	C0G090595016	REG	C0G090595	SW8081	1000	Endrin ketone	870	U	UJ	PM	ug/kg
SE-26 7/7/10	C0G090595016	REG	C0G090595	SW8081	1000	gamma-BHC (Lindane)	870	U	UJ	PM	ug/kg
SE-26 7/7/10	C0G090595016	REG	C0G090595	SW8081	1000	gamma-Chlordane	870	U	UJ	PM	ug/kg
SE-26 7/7/10	C0G090595016	REG	C0G090595	SW8081	1000	Heptachlor	870	U	UJ	PM	ug/kg
SE-26 7/7/10	C0G090595016	REG	C0G090595	SW8081	1000	Heptachlor epoxide	870	U	UJ	PM	ug/kg
SE-26 7/7/10	C0G090595016	REG	C0G090595	SW8081	1000	Methoxychlor	1700	U	UJ	PM	ug/kg

TABLE 2 - VALIDATION ACTION SUMMARY
DATA VALIDATION SUMMARY REPORT
JULY 2010 SEDIMENT AND SOIL SAMPLES
HONEYWELL – CLAYMONT
CLAYMONT, DELAWARE

Field Sample ID	Lab Sample ID	Type	SDG	Method	Dilution Factor	Parameter Name	Lab Result	Lab Qual	Val Qual	Reason Codes	Units
SE-26 7/7/10	C0G090595016	REG	C0G090595	SW8081	1000	Toxaphene	35000	U	UJ	PM	ug/kg
SE-28 7/7/10	C0G090595018	REG	C0G090595	SW8081	1000	4,4'-DDD	42000		J	PM	ug/kg
SE-28 7/7/10	C0G090595018	REG	C0G090595	SW8081	1000	4,4'-DDE	6300		J	PM	ug/kg
SE-28 7/7/10	C0G090595018	REG	C0G090595	SW8081	1000	4,4'-DDT	74000		J	PM	ug/kg
SE-28 7/7/10	C0G090595018	REG	C0G090595	SW8081	1000	Aldrin	1300	U	UJ	PM	ug/kg
SE-28 7/7/10	C0G090595018	REG	C0G090595	SW8081	1000	alpha-BHC	850	J	J	PM	ug/kg
SE-28 7/7/10	C0G090595018	REG	C0G090595	SW8081	1000	alpha-Chlordane	1300	U	UJ	PM	ug/kg
SE-28 7/7/10	C0G090595018	REG	C0G090595	SW8081	1000	beta-BHC	2400		J	PM	ug/kg
SE-28 7/7/10	C0G090595018	REG	C0G090595	SW8081	1000	delta-BHC	220	JPG	J	PM	ug/kg
SE-28 7/7/10	C0G090595018	REG	C0G090595	SW8081	1000	Dieldrin	1300	U	UJ	PM	ug/kg
SE-28 7/7/10	C0G090595018	REG	C0G090595	SW8081	1000	Endosulfan I	1300	U	UJ	PM	ug/kg
SE-28 7/7/10	C0G090595018	REG	C0G090595	SW8081	1000	Endosulfan II	1300	U	UJ	PM	ug/kg
SE-28 7/7/10	C0G090595018	REG	C0G090595	SW8081	1000	Endosulfan sulfate	1300	U	UJ	PM	ug/kg
SE-28 7/7/10	C0G090595018	REG	C0G090595	SW8081	1000	Endrin	1300	U	UJ	PM	ug/kg
SE-28 7/7/10	C0G090595018	REG	C0G090595	SW8081	1000	Endrin aldehyde	1300	U	UJ	PM	ug/kg
SE-28 7/7/10	C0G090595018	REG	C0G090595	SW8081	1000	Endrin ketone	1300	U	UJ	PM	ug/kg
SE-28 7/7/10	C0G090595018	REG	C0G090595	SW8081	1000	gamma-BHC (Lindane)	1300	U	UJ	PM	ug/kg
SE-28 7/7/10	C0G090595018	REG	C0G090595	SW8081	1000	gamma-Chlordane	1300	U	UJ	PM	ug/kg
SE-28 7/7/10	C0G090595018	REG	C0G090595	SW8081	1000	Heptachlor	1300	U	UJ	PM	ug/kg
SE-28 7/7/10	C0G090595018	REG	C0G090595	SW8081	1000	Heptachlor epoxide	1300	U	UJ	PM	ug/kg
SE-28 7/7/10	C0G090595018	REG	C0G090595	SW8081	1000	Methoxychlor	2600	U	UJ	PM	ug/kg
SE-28 7/7/10	C0G090595018	REG	C0G090595	SW8081	1000	Toxaphene	51000	U	UJ	PM	ug/kg
SE-29 7/7/10	C0G090595019	REG	C0G090595	SW8081	1000	4,4'-DDD	23000		J	PM	ug/kg
SE-29 7/7/10	C0G090595019	REG	C0G090595	SW8081	1000	4,4'-DDE	2100		J	PM	ug/kg
SE-29 7/7/10	C0G090595019	REG	C0G090595	SW8081	1000	4,4'-DDT	1200		J	PM	ug/kg
SE-29 7/7/10	C0G090595019	REG	C0G090595	SW8081	1000	Aldrin	1100	U	UJ	PM	ug/kg
SE-29 7/7/10	C0G090595019	REG	C0G090595	SW8081	1000	alpha-BHC	3900		J	PM	ug/kg
SE-29 7/7/10	C0G090595019	REG	C0G090595	SW8081	1000	alpha-Chlordane	1100	U	UJ	PM	ug/kg
SE-29 7/7/10	C0G090595019	REG	C0G090595	SW8081	1000	delta-BHC	2100		J	PM	ug/kg
SE-29 7/7/10	C0G090595019	REG	C0G090595	SW8081	1000	Dieldrin	1100	U	UJ	PM	ug/kg
SE-29 7/7/10	C0G090595019	REG	C0G090595	SW8081	1000	Endosulfan I	1100	U	UJ	PM	ug/kg
SE-29 7/7/10	C0G090595019	REG	C0G090595	SW8081	1000	Endosulfan II	1100	U	UJ	PM	ug/kg
SE-29 7/7/10	C0G090595019	REG	C0G090595	SW8081	1000	Endosulfan sulfate	1100	U	UJ	PM	ug/kg
SE-29 7/7/10	C0G090595019	REG	C0G090595	SW8081	1000	Endrin	1100	U	UJ	PM	ug/kg
SE-29 7/7/10	C0G090595019	REG	C0G090595	SW8081	1000	Endrin aldehyde	1100	U	UJ	PM	ug/kg
SE-29 7/7/10	C0G090595019	REG	C0G090595	SW8081	1000	Endrin ketone	1100	U	UJ	PM	ug/kg

TABLE 2 - VALIDATION ACTION SUMMARY
DATA VALIDATION SUMMARY REPORT
JULY 2010 SEDIMENT AND SOIL SAMPLES
HONEYWELL – CLAYMONT
CLAYMONT, DELAWARE

Field Sample ID	Lab Sample ID	Type	SDG	Method	Dilution Factor	Parameter Name	Lab Result	Lab Qual	Val Qual	Reason Codes	Units
SE-29 7/7/10	C0G090595019	REG	C0G090595	SW8081	1000	gamma-BHC (Lindane)	1000	J	J	PM	ug/kg
SE-29 7/7/10	C0G090595019	REG	C0G090595	SW8081	1000	gamma-Chlordane	1100	U	UJ	PM	ug/kg
SE-29 7/7/10	C0G090595019	REG	C0G090595	SW8081	1000	Heptachlor	1100	U	UJ	PM	ug/kg
SE-29 7/7/10	C0G090595019	REG	C0G090595	SW8081	1000	Heptachlor epoxide	1100	U	UJ	PM	ug/kg
SE-29 7/7/10	C0G090595019	REG	C0G090595	SW8081	1000	Methoxychlor	2300	U	UJ	PM	ug/kg
SE-29 7/7/10	C0G090595019	REG	C0G090595	SW8081	1000	Toxaphene	45000	U	UJ	PM	ug/kg
SP-1 7/7/10	C0G090598001	REG	C0G090598	SW8081	10000	Dieldrin	180	JPG	J	CFP	ug/kg
SP-10 7/7/10	C0G090598012	REG	C0G090598	SW8081	9.9	delta-BHC	0.14	JPG	J	CFP	ug/kg
SP-10 7/7/10	C0G090598012	REG	C0G090598	SW8081	9.9	Endosulfan II	0.31	JPG	J	CFP	ug/kg
SP-10 7/7/10	C0G090598012	REG	C0G090598	SW8081	9.9	Endosulfan sulfate	0.61	JPG	J	CFP	ug/kg
SP-10 7/7/10	C0G090598012	REG	C0G090598	SW8081	9.9	Endrin ketone	0.16	JPG	J	CFP	ug/kg
SP-11 7/7/10	C0G090598010	REG	C0G090598	SW8081	10	alpha-BHC	0.44	JPG	J	CFP	ug/kg
SP-11 7/7/10	C0G090598010	REG	C0G090598	SW8081	10	Dieldrin	0.98	JPG	J	CFP	ug/kg
SP-11 7/7/10	C0G090598010	REG	C0G090598	SW8081	10	Endosulfan sulfate	1	JPG	J	CFP	ug/kg
SP-11 7/7/10	C0G090598010	REG	C0G090598	SW8081	10	Endrin	1.4	PG	J	CFP	ug/kg
SP-11 7/7/10	C0G090598010	REG	C0G090598	SW8081	10	Endrin ketone	1.6	PG	J	CFP	ug/kg
SP-11 7/7/10	C0G090598010	REG	C0G090598	SW8081	10	gamma-Chlordane	0.5	JPG	J	CFP	ug/kg
SP-11 7/7/10	C0G090598010	REG	C0G090598	SW8081	10	Heptachlor epoxide	1	JPG	J	CFP	ug/kg
SP-12 7/7/10	C0G090598011	REG	C0G090598	SW8081	10	delta-BHC	0.22	JPG	J	CFP	ug/kg
SP-12 7/7/10	C0G090598011	REG	C0G090598	SW8081	10	Dieldrin	0.69	JPG	J	CFP	ug/kg
SP-12 7/7/10	C0G090598011	REG	C0G090598	SW8081	10	Endrin	0.29	JPG	J	CFP	ug/kg
SP-12 7/7/10	C0G090598011	REG	C0G090598	SW8081	10	gamma-BHC (Lindane)	0.63	JPG	J	CFP	ug/kg
SP-13 7/8/10	C0G090598014	REG	C0G090598	SW8081	20	Aldrin	0.51	JPG	J	CFP	ug/kg
SP-13 7/8/10	C0G090598014	REG	C0G090598	SW8081	20	beta-BHC	1.1	JPG	J	CFP	ug/kg
SP-13 7/8/10	C0G090598014	REG	C0G090598	SW8081	20	delta-BHC	0.35	JPG	J	CFP	ug/kg
SP-13 7/8/10	C0G090598014	REG	C0G090598	SW8081	20	Dieldrin	0.6	JPG	J	CFP	ug/kg
SP-13 7/8/10	C0G090598014	REG	C0G090598	SW8081	20	gamma-Chlordane	2.2	PG	J	CFP	ug/kg
SP-14 7/8/10	C0G090598015	REG	C0G090598	SW8081	20	4,4'-DDE	15	PG	J	CFP	ug/kg
SP-14 7/8/10	C0G090598015	REG	C0G090598	SW8081	20	delta-BHC	6.8	PG	J	CFP	ug/kg
SP-14 7/8/10	C0G090598015	REG	C0G090598	SW8081	20	gamma-BHC (Lindane)	1.1	JPG	J	CFP	ug/kg
SP-14 7/8/10	C0G090598015	REG	C0G090598	SW8081	20	Heptachlor	8.7	PG	J	CFP	ug/kg
SP-16 7/8/10	C0G090598013	REG	C0G090598	SW8081	9.9	Dieldrin	2.3	PG	J	CFP	ug/kg
SP-16 7/8/10	C0G090598013	REG	C0G090598	SW8081	9.9	Endrin	1	JPG	J	CFP	ug/kg
SP-16 7/8/10 Dup	C0G090598017	REG	C0G090598	SW8081	3.97	Dieldrin	2.4	PG	J	CFP	ug/kg
SP-16 7/8/10 Dup	C0G090598017	REG	C0G090598	SW8081	3.97	Endosulfan sulfate	0.18	JPG	J	CFP	ug/kg
SP-16 7/8/10 Dup	C0G090598017	REG	C0G090598	SW8081	3.97	Endrin ketone	1.2	PG	J	CFP	ug/kg

TABLE 2 - VALIDATION ACTION SUMMARY
DATA VALIDATION SUMMARY REPORT
JULY 2010 SEDIMENT AND SOIL SAMPLES
HONEYWELL – CLAYMONT
CLAYMONT, DELAWARE

Field Sample ID	Lab Sample ID	Type	SDG	Method	Dilution Factor	Parameter Name	Lab Result	Lab Qual	Val Qual	Reason Codes	Units
SP-16 7/8/10 Dup	C0G090598017	REG	C0G090598	SW8081	3.97	gamma-Chlordane	1.4	PG	J	CFP	ug/kg
SP-16 7/8/10 Dup	C0G090598017	REG	C0G090598	SW8081	3.97	Heptachlor	0.17	JPG	J	CFP	ug/kg
SP-16 7/8/10 Dup	C0G090598017	REG	C0G090598	SW8081	3.97	Heptachlor epoxide	0.87	PG	J	CFP	ug/kg
SP-5 7/7/10	C0G090598003	REG	C0G090598	SW8081	200	Dieldrin	6.4	JPG	J	CFP	ug/kg
SP-6 7/7/10	C0G090598009	REG	C0G090598	SW8081	200	beta-BHC	5.6	JPG	J	CFP	ug/kg
SP-6 7/7/10	C0G090598009	REG	C0G090598	SW8081	200	gamma-Chlordane	16	JPG	J	CFP	ug/kg
SP-7 7/7/10	C0G090598008	REG	C0G090598	SW8081	200	alpha-Chlordane	9	JPG	J	CFP	ug/kg
SP-7 7/7/10	C0G090598008	REG	C0G090598	SW8081	200	Endrin ketone	9.7	JPG	J	CFP	ug/kg
SP-7 7/7/10	C0G090598008	REG	C0G090598	SW8081	200	gamma-Chlordane	180	PG	J	CFP	ug/kg
SP-7 7/7/10	C0G090598008	REG	C0G090598	SW8081	200	Heptachlor	61	PG	J	CFP	ug/kg
SP-9 7/7/10	C0G090598007	REG	C0G090598	SW8081	10	Endosulfan sulfate	0.23	JPG	J	CFP	ug/kg
SP-16 7/8/10	C0G090598013	REG	C0G090598	SW8081	9.9	4,4'-DDT	41		J	FD	ug/kg
SP-16 7/8/10 Dup	C0G090598017	REG	C0G090598	SW8081	3.97	4,4'-DDT	20		J	FD	ug/kg

BL1	Result qualified due to laboratory blank
CFP	Confirmation dual column precision exceeded
FD	Field duplicate exceeds RPD criteria
PM	Sample percent moisture exceeds 90 percent

TABLE 3 - FINAL RESULTS
DATA VALIDATION SUMMARY REPORT
JULY 2010 SEDIMENT AND SOIL SAMPLES
HONEYWELL – CLAYMONT
CLAYMONT, DELAWARE

		Field Sample ID	SE-11 7/7/10		SE-12 7/7/10		SE-13 7/7/10	
		Location	SE-11		SE-12		SE-13	
		Sample Date	7/7/2010		7/7/2010		7/7/2010	
		Sample Purpose	Regular sample		Regular sample		Regular sample	
		Sample Type	Sediment (river or water bottoms)		Sediment (river or water bottoms)		Sediment (river or water bottoms)	
Lab Units	Analytical Method	Parameter Name	result	qual	result	qual	result	qual
%	SM2540G	Percent Solids	48.5		36.7		34.2	
mg/kg	Lloyd Kahn	TOC	26800		36400		30700	
mg/kg	SW6020A	Arsenic	255		84.2		56.6	
mg/kg	SW6020A	Lead	488		100		69.3	
ug/kg	SW8081	4,4'-DDD	1300		310		240	
ug/kg	SW8081	4,4'-DDE	280	J	30	J	17	J
ug/kg	SW8081	4,4'-DDT	620		170		150	
ug/kg	SW8081	Aldrin	34	U	4.5	U	1.8	J
ug/kg	SW8081	alpha-BHC	33	J	4.5	U	1	J
ug/kg	SW8081	alpha-Chlordane	34	U	4.5	U	4.9	U
ug/kg	SW8081	beta-BHC	34	U	4.5	U	3.6	J
ug/kg	SW8081	delta-BHC	9.4	J	1.2	J	3.5	J
ug/kg	SW8081	Dieldrin	180		4.5	U	4.9	U
ug/kg	SW8081	Endosulfan I	34	U	4.5	U	4.9	U
ug/kg	SW8081	Endosulfan II	34	U	4.5	U	4.9	U
ug/kg	SW8081	Endosulfan sulfate	34	U	4.5	U	4.9	U
ug/kg	SW8081	Endrin	34	U	4.5	U	4.9	U
ug/kg	SW8081	Endrin aldehyde	34	U	4.5	U	4.9	U
ug/kg	SW8081	Endrin ketone	34	U	4.5	U	4.9	U
ug/kg	SW8081	gamma-BHC (Lindane)	12	J	0.91	J	4.9	U
ug/kg	SW8081	gamma-Chlordane	34	U	4.5	U	7.9	
ug/kg	SW8081	Heptachlor	34	U	4.5	U	4.9	U
ug/kg	SW8081	Heptachlor epoxide	34	U	4.5	U	4.9	U
ug/kg	SW8081	Methoxychlor	69	U	9.1	U	9.7	U
ug/kg	SW8081	Toxaphene	1400	U	180	U	190	U

Notes:
U = Not detected
J = Analyte present at a value that may not be accurate or precise
B = Not detected substantially above the level reported in the lab blanks
ug/kg = microgram per kilogram
mg/kg - milligram per kilogram
% = percent

TABLE 3 - FINAL RESULTS
DATA VALIDATION SUMMARY REPORT
JULY 2010 SEDIMENT AND SOIL SAMPLES
HONEYWELL – CLAYMONT
CLAYMONT, DELAWARE

		Field Sample ID	SE-14 7/7/10		SE-15 7/7/10		SE-16 7/7/10	
		Location	SE-14		SE-15		SE-16	
		Sample Date	7/7/2010		7/7/2010		7/7/2010	
		Sample Purpose	Regular sample		Regular sample		Regular sample	
		Sample Type	Sediment (river or water bottoms)		Sediment (river or water bottoms)		Sediment (river or water bottoms)	
Lab Units	Analytical Method	Parameter Name	result	qual	result	qual	result	qual
%	SM2540G	Percent Solids	34.3		39.4		44	
mg/kg	Lloyd Kahn	TOC	41200		30000		25900	
mg/kg	SW6020A	Arsenic	86.4		89		129	
mg/kg	SW6020A	Lead	76.5		69.4		77.5	
ug/kg	SW8081	4,4'-DDD	280		740		850	
ug/kg	SW8081	4,4'-DDE	34	J	36	J	64	J
ug/kg	SW8081	4,4'-DDT	270		930		1200	
ug/kg	SW8081	Aldrin	4.8	U	42	U	19	U
ug/kg	SW8081	alpha-BHC	0.79	J	42	U	19	U
ug/kg	SW8081	alpha-Chlordane	4.8	U	42	U	19	U
ug/kg	SW8081	beta-BHC	3.7	J	42	U	19	U
ug/kg	SW8081	delta-BHC	1.3	J	9.5	J	19	U
ug/kg	SW8081	Dieldrin	51		62		19	U
ug/kg	SW8081	Endosulfan I	4.8	U	42	U	19	U
ug/kg	SW8081	Endosulfan II	4.8	U	42	U	19	U
ug/kg	SW8081	Endosulfan sulfate	4.8	U	42	U	19	U
ug/kg	SW8081	Endrin	1.6	J	42	U	19	U
ug/kg	SW8081	Endrin aldehyde	4.8	U	42	U	19	U
ug/kg	SW8081	Endrin ketone	4.8	U	42	U	19	U
ug/kg	SW8081	gamma-BHC (Lindane)	2.3	J	42	U	19	U
ug/kg	SW8081	gamma-Chlordane	13		42	U	19	U
ug/kg	SW8081	Heptachlor	4.8	U	42	U	19	U
ug/kg	SW8081	Heptachlor epoxide	4.8	U	42	U	19	U
ug/kg	SW8081	Methoxychlor	9.6	U	85	U	38	U
ug/kg	SW8081	Toxaphene	190	U	1700	U	760	U

Notes:

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B = Not detected substantially above the level reported in the lab blanks

ug/kg = microgram per kilogram

mg/kg - milligram per kilogram

% = percent

Produced by: WHB 09/02/10

Checked by: TLC 09/02/10

TABLE 3 - FINAL RESULTS
DATA VALIDATION SUMMARY REPORT
JULY 2010 SEDIMENT AND SOIL SAMPLES
HONEYWELL – CLAYMONT
CLAYMONT, DELAWARE

		Field Sample ID	SE-17 7/7/10		SE-18 7/7/10		SE-19 7/7/10	
		Location	SE-17		SE-18		SE-19	
		Sample Date	7/7/2010		7/7/2010		7/7/2010	
		Sample Purpose	Regular sample		Regular sample		Regular sample	
		Sample Type	Sediment (river or water bottoms)		Sediment (river or water bottoms)		Sediment (river or water bottoms)	
Lab Units	Analytical Method	Parameter Name	result	qual	result	qual	result	qual
%	SM2540G	Percent Solids	46		40.4		31.9	
mg/kg	Lloyd Kahn	TOC	22900		24100		32400	
mg/kg	SW6020A	Arsenic	1050		25.8		16.7	
mg/kg	SW6020A	Lead	481		64.1		50.2	
ug/kg	SW8081	4,4'-DDD	4200		260		140	
ug/kg	SW8081	4,4'-DDE	180	J	38	J	16	
ug/kg	SW8081	4,4'-DDT	2900		500		110	
ug/kg	SW8081	Aldrin	180	U	21	U	2.6	U
ug/kg	SW8081	alpha-BHC	32	J	21	U	2.6	U
ug/kg	SW8081	alpha-Chlordane	180	U	21	U	2.6	U
ug/kg	SW8081	beta-BHC	180	U	21	U	3.9	
ug/kg	SW8081	delta-BHC	180	U	21	U	0.59	J
ug/kg	SW8081	Dieldrin	460		28		2.6	U
ug/kg	SW8081	Endosulfan I	180	U	21	U	2.6	U
ug/kg	SW8081	Endosulfan II	180	U	21	U	2.6	U
ug/kg	SW8081	Endosulfan sulfate	180	U	21	U	2.6	U
ug/kg	SW8081	Endrin	180	U	21	U	2.6	U
ug/kg	SW8081	Endrin aldehyde	180	U	21	U	2.6	U
ug/kg	SW8081	Endrin ketone	180	U	21	U	2.6	U
ug/kg	SW8081	gamma-BHC (Lindane)	180	U	21	U	2.6	U
ug/kg	SW8081	gamma-Chlordane	180	U	21	U	21	
ug/kg	SW8081	Heptachlor	180	U	21	U	2.6	U
ug/kg	SW8081	Heptachlor epoxide	180	U	21	U	2.6	U
ug/kg	SW8081	Methoxychlor	360	U	41	U	5.2	U
ug/kg	SW8081	Toxaphene	7300	U	820	U	100	U

Notes:

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ug/kg = microgram per kilogram

mg/kg - milligram per kilogram

% = percent

TABLE 3 - FINAL RESULTS
DATA VALIDATION SUMMARY REPORT
JULY 2010 SEDIMENT AND SOIL SAMPLES
HONEYWELL – CLAYMONT
CLAYMONT, DELAWARE

		Field Sample ID	SE-20 7/7/10		SE-21 7/7/10		SE-22 7/7/10	
		Location	SE-20		SE-21		SE-22	
		Sample Date	7/7/2010		7/7/2010		7/7/2010	
		Sample Purpose	Regular sample		Regular sample		Regular sample	
		Sample Type	Sediment (river or water bottoms)		Sediment (river or water bottoms)		Sediment (river or water bottoms)	
Lab Units	Analytical Method	Parameter Name	result	qual	result	qual	result	qual
%	SM2540G	Percent Solids	43		43		45.6	
mg/kg	Lloyd Kahn	TOC	22500		26700		26600	
mg/kg	SW6020A	Arsenic	20		61.3		860	
mg/kg	SW6020A	Lead	38.1		127		353	
ug/kg	SW8081	4,4'-DDD	150		190		350	
ug/kg	SW8081	4,4'-DDE	13	J	220	J	55	J
ug/kg	SW8081	4,4'-DDT	190		230		440	
ug/kg	SW8081	Aldrin	3.9	U	6.1	J	5.5	J
ug/kg	SW8081	alpha-BHC	3.9	U	3.9	U	18	U
ug/kg	SW8081	alpha-Chlordane	3.9	U	3.9	U	18	U
ug/kg	SW8081	beta-BHC	3.9	U	3.9	U	18	U
ug/kg	SW8081	delta-BHC	0.64	J	3.9	U	18	U
ug/kg	SW8081	Dieldrin	3.9	U	3.9	U	18	U
ug/kg	SW8081	Endosulfan I	3.9	U	2.1	J	18	U
ug/kg	SW8081	Endosulfan II	3.9	U	2.1	J	18	U
ug/kg	SW8081	Endosulfan sulfate	3.9	U	2.6	J	18	U
ug/kg	SW8081	Endrin	3.9	U	10		18	U
ug/kg	SW8081	Endrin aldehyde	3.9	U	3.9	U	18	U
ug/kg	SW8081	Endrin ketone	3.9	U	4.3	J	18	U
ug/kg	SW8081	gamma-BHC (Lindane)	2.1	J	3.9	U	18	U
ug/kg	SW8081	gamma-Chlordane	5.5		3.9	U	18	U
ug/kg	SW8081	Heptachlor	3.9	U	3.9	U	18	U
ug/kg	SW8081	Heptachlor epoxide	3.9	U	3.9	U	18	U
ug/kg	SW8081	Methoxychlor	7.7	U	7.8	U	37	U
ug/kg	SW8081	Toxaphene	150	U	160	U	730	U

Notes:

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ug/kg = microgram per kilogram

mg/kg - milligram per kilogram

% = percent

TABLE 3 - FINAL RESULTS
DATA VALIDATION SUMMARY REPORT
JULY 2010 SEDIMENT AND SOIL SAMPLES
HONEYWELL – CLAYMONT
CLAYMONT, DELAWARE

		Field Sample ID	SE-23 7/7/10		SE-24 7/7/10		SE-25 7/7/10	
		Location	SE-23		SE-24		SE-25	
		Sample Date	7/7/2010		7/7/2010		7/7/2010	
		Sample Purpose	Regular sample		Regular sample		Regular sample	
		Sample Type	Sediment (river or water bottoms)		Sediment (river or water bottoms)		Sediment (river or water bottoms)	
Lab Units	Analytical Method	Parameter Name	result	qual	result	qual	result	qual
%	SM2540G	Percent Solids	43.6		39.1		4.5	
mg/kg	Lloyd Kahn	TOC	33700		12400		93300	J
mg/kg	SW6020A	Arsenic	165		3500		944	J
mg/kg	SW6020A	Lead	165		611		260	J
ug/kg	SW8081	4,4'-DDD	1900		1500		68000	J
ug/kg	SW8081	4,4'-DDE	240		340		8700	J
ug/kg	SW8081	4,4'-DDT	2600		1600		140000	J
ug/kg	SW8081	Aldrin	38	U	43	U	1800	UJ
ug/kg	SW8081	alpha-BHC	38	U	430		350	J
ug/kg	SW8081	alpha-Chlordane	38	U	43	U	1800	UJ
ug/kg	SW8081	beta-BHC	38	U	60		1800	UJ
ug/kg	SW8081	delta-BHC	38	U	72		1800	UJ
ug/kg	SW8081	Dieldrin	7.8	J	43	U	1800	UJ
ug/kg	SW8081	Endosulfan I	38	U	43	U	1800	UJ
ug/kg	SW8081	Endosulfan II	38	U	43	U	1800	UJ
ug/kg	SW8081	Endosulfan sulfate	38	U	43	U	1800	UJ
ug/kg	SW8081	Endrin	38	U	43	U	1800	UJ
ug/kg	SW8081	Endrin aldehyde	38	U	43	U	1800	UJ
ug/kg	SW8081	Endrin ketone	38	U	43	U	1800	UJ
ug/kg	SW8081	gamma-BHC (Lindane)	38	U	100		1800	UJ
ug/kg	SW8081	gamma-Chlordane	38	U	43	U	1800	UJ
ug/kg	SW8081	Heptachlor	38	U	43	U	1800	UJ
ug/kg	SW8081	Heptachlor epoxide	38	U	43	U	1800	UJ
ug/kg	SW8081	Methoxychlor	77	U	85	U	3600	UJ
ug/kg	SW8081	Toxaphene	1500	U	1700	U	73000	UJ

Notes:

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mg/kg - milligram per kilogram

% = percent

TABLE 3 - FINAL RESULTS
DATA VALIDATION SUMMARY REPORT
JULY 2010 SEDIMENT AND SOIL SAMPLES
HONEYWELL – CLAYMONT
CLAYMONT, DELAWARE

		Field Sample ID	SE-25 7/7/10 DUP		SE-26 7/7/10		SE-27 7/7/10	
		Location	SE-25		SE-26		SE-27	
		Sample Date	7/7/2010		7/7/2010		7/7/2010	
		Sample Purpose	Field duplicate		Regular sample		Regular sample	
		Sample Type	Sediment (river or water bottoms)		Sediment (river or water bottoms)		Sediment (river or water bottoms)	
Lab Units	Analytical Method	Parameter Name	result	qual	result	qual	result	qual
%	SM2540G	Percent Solids	5.1		9.6		28.9	
mg/kg	Lloyd Kahn	TOC	58500	J	58200	J	41500	
mg/kg	SW6020A	Arsenic	741	J	960	J	396	
mg/kg	SW6020A	Lead	190	J	738	J	408	
ug/kg	SW8081	4,4'-DDD	56000	J	66000	J	1800000	
ug/kg	SW8081	4,4'-DDE	4500	J	5800	J	220000	
ug/kg	SW8081	4,4'-DDT	89000	J	32000	J	5300000	
ug/kg	SW8081	Aldrin	1600	UJ	870	UJ	140000	U
ug/kg	SW8081	alpha-BHC	300	J	350	J	38000	J
ug/kg	SW8081	alpha-Chlordane	1600	UJ	870	UJ	140000	U
ug/kg	SW8081	beta-BHC	1600	UJ	870	UJ	140000	U
ug/kg	SW8081	delta-BHC	1600	UJ	170	J	140000	U
ug/kg	SW8081	Dieldrin	1600	UJ	870	UJ	140000	U
ug/kg	SW8081	Endosulfan I	1600	UJ	870	UJ	140000	U
ug/kg	SW8081	Endosulfan II	1600	UJ	870	UJ	140000	U
ug/kg	SW8081	Endosulfan sulfate	1600	UJ	870	UJ	140000	U
ug/kg	SW8081	Endrin	1600	UJ	870	UJ	140000	U
ug/kg	SW8081	Endrin aldehyde	1600	UJ	870	UJ	140000	U
ug/kg	SW8081	Endrin ketone	1600	UJ	870	UJ	140000	U
ug/kg	SW8081	gamma-BHC (Lindane)	1600	UJ	870	UJ	140000	U
ug/kg	SW8081	gamma-Chlordane	1600	UJ	870	UJ	140000	U
ug/kg	SW8081	Heptachlor	1600	UJ	870	UJ	140000	U
ug/kg	SW8081	Heptachlor epoxide	1600	UJ	870	UJ	140000	U
ug/kg	SW8081	Methoxychlor	3200	UJ	1700	UJ	290000	U
ug/kg	SW8081	Toxaphene	65000	UJ	35000	UJ	5800000	U

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TABLE 3 - FINAL RESULTS
DATA VALIDATION SUMMARY REPORT
JULY 2010 SEDIMENT AND SOIL SAMPLES
HONEYWELL – CLAYMONT
CLAYMONT, DELAWARE

		Field Sample ID	SE-28 7/7/10		SE-29 7/7/10	
		Location	SE-28		SE-29	
		Sample Date	7/7/2010		7/7/2010	
		Sample Purpose	Regular sample		Regular sample	
		Sample Type	Sediment (river or water bottoms)		Sediment (river or water bottoms)	
Lab Units	Analytical Method	Parameter Name	result	qual	result	qual
%	SM2540G	Percent Solids	6.5		7.3	
mg/kg	Lloyd Kahn	TOC	80100	J	20000	J
mg/kg	SW6020A	Arsenic	785	J	1010	J
mg/kg	SW6020A	Lead	282	J	2020	J
ug/kg	SW8081	4,4'-DDD	42000	J	23000	J
ug/kg	SW8081	4,4'-DDE	6300	J	2100	J
ug/kg	SW8081	4,4'-DDT	74000	J	1200	J
ug/kg	SW8081	Aldrin	1300	UJ	1100	UJ
ug/kg	SW8081	alpha-BHC	850	J	3900	J
ug/kg	SW8081	alpha-Chlordane	1300	UJ	1100	UJ
ug/kg	SW8081	beta-BHC	2400	J	320	J
ug/kg	SW8081	delta-BHC	220	J	2100	J
ug/kg	SW8081	Dieldrin	1300	UJ	1100	UJ
ug/kg	SW8081	Endosulfan I	1300	UJ	1100	UJ
ug/kg	SW8081	Endosulfan II	1300	UJ	1100	UJ
ug/kg	SW8081	Endosulfan sulfate	1300	UJ	1100	UJ
ug/kg	SW8081	Endrin	1300	UJ	1100	UJ
ug/kg	SW8081	Endrin aldehyde	1300	UJ	1100	UJ
ug/kg	SW8081	Endrin ketone	1300	UJ	1100	UJ
ug/kg	SW8081	gamma-BHC (Lindane)	1300	UJ	1000	J
ug/kg	SW8081	gamma-Chlordane	1300	UJ	1100	UJ
ug/kg	SW8081	Heptachlor	1300	UJ	1100	UJ
ug/kg	SW8081	Heptachlor epoxide	1300	UJ	1100	UJ
ug/kg	SW8081	Methoxychlor	2600	UJ	2300	UJ
ug/kg	SW8081	Toxaphene	51000	UJ	45000	UJ

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mg/kg - milligram per kilogram
% = percent

TABLE 3 - FINAL RESULTS
DATA VALIDATION SUMMARY REPORT
JULY 2010 SEDIMENT AND SOIL SAMPLES
HONEYWELL – CLAYMONT
CLAYMONT, DELAWARE

		Field Sample ID	SP-1 7/7/10		SP-10 7/7/10		SP-11 7/7/10		SP-12 7/7/10		SP-13 7/8/10	
		Location	SP-1		SP-10		SP-11		SP-12		SP-13	
		Sample Date	7/7/2010		7/7/2010		7/7/2010		7/7/2010		7/8/2010	
		Sample Purpose	Regular sample		Regular sample		Regular sample		Regular sample		Regular sample	
		Sample Type	Soil sample - General		Soil sample - General		Soil sample - General		Soil sample - General		Soil sample - General	
Lab Units	Analytical Method	Parameter Name	result	qual	result	qual	result	qual	result	qual	result	qual
%	SM2540G	Percent Solids	97.4		88.7		78.3		79.7		86.1	
mg/kg	Lloyd Kahn	TOC	43900		8880		48700		39800		9910	
mg/kg	SW6020A	Arsenic	973		0.24	JB	11.5		0.98		0.44	JB
mg/kg	SW6020A	Lead	3400		39.1		128		60.9		77.7	
ug/kg	SW8081	4,4'-DDD	22000		1.9		8.1		6.1		34	
ug/kg	SW8081	4,4'-DDE	9300		1.6		6.8		8.9		29	
ug/kg	SW8081	4,4'-DDT	55000		5.5		23		28		87	
ug/kg	SW8081	Aldrin	860	U	0.93	U	1.1		1	U	0.51	J
ug/kg	SW8081	alpha-BHC	2400		0.93	U	0.44	J	1	U	1.9	U
ug/kg	SW8081	alpha-Chlordane	860	U	0.93	U	1.1	U	1	U	1.9	U
ug/kg	SW8081	beta-BHC	2200		0.93	U	1.1	U	1	U	1.1	J
ug/kg	SW8081	delta-BHC	320		0.14	J	1.1	U	0.22	J	0.35	J
ug/kg	SW8081	Dieldrin	180	J	1		0.98	J	0.69	J	0.6	J
ug/kg	SW8081	Endosulfan I	860	U	0.93	U	1.1	U	1	U	1.9	U
ug/kg	SW8081	Endosulfan II	190		0.31	J	1.1	U	1	U	1.9	U
ug/kg	SW8081	Endosulfan sulfate	860	U	0.61	J	1	J	1	U	1.9	U
ug/kg	SW8081	Endrin	860	U	0.93	U	1.4	J	0.29	J	17	
ug/kg	SW8081	Endrin aldehyde	860	U	0.93	U	1.1	U	1	U	1.9	U
ug/kg	SW8081	Endrin ketone	860	U	0.16	J	1.6	J	0.67	J	1.9	U
ug/kg	SW8081	gamma-BHC (Lindane)	1400		1.3		0.79	J	0.63	J	1.7	J
ug/kg	SW8081	gamma-Chlordane	670	J	0.93	U	0.5	J	1	U	2.2	J
ug/kg	SW8081	Heptachlor	860	U	0.93	U	1.1	U	1	U	1.9	U
ug/kg	SW8081	Heptachlor epoxide	860	U	0.93	U	1	J	0.29	J	1.9	U
ug/kg	SW8081	Methoxychlor	1700	U	1.9	U	2.1	U	2.1	U	3.9	U
ug/kg	SW8081	Toxaphene	34000	U	37	U	43	U	42	U	77	U

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% = percent

Produced by:WHB 09/02/10
Checked by: TLC 09/02/10

TABLE 3 - FINAL RESULTS
DATA VALIDATION SUMMARY REPORT
JULY 2010 SEDIMENT AND SOIL SAMPLES
HONEYWELL – CLAYMONT
CLAYMONT, DELAWARE

		Field Sample ID	SP-14 7/8/10		SP-15 7/8/10		SP-16 7/8/10		SP-16 7/8/10 Dup		SP-2 7/7/10	
		Location	SP-14		SP-15		SP-16		SP-16		SP-2	
		Sample Date	7/8/2010		7/8/2010		7/8/2010		7/8/2010		7/7/2010	
		Sample Purpose	Regular sample		Regular sample		Regular sample		Regular sample		Regular sample	
		Sample Type	Soil sample - General		Soil sample - General		Soil sample - General		Soil sample - General		Soil sample - General	
Lab Units	Analytical Method	Parameter Name	result	qual	result	qual	result	qual	result	qual	result	qual
%	SM2540G	Percent Solids	93.1		77.3		72.5		72.2		83.5	
mg/kg	Lloyd Kahn	TOC	48300		14800		35000		35200		135000	
mg/kg	SW6020A	Arsenic	6.1		8.7		1.1		1		123	
mg/kg	SW6020A	Lead	248		108		89.4		86.9		382	
ug/kg	SW8081	4,4'-DDD	14		110		9.9		6.6		5700	
ug/kg	SW8081	4,4'-DDE	15	J	75		9.5		11		2200	
ug/kg	SW8081	4,4'-DDT	38		380		41	J	20	J	10000	
ug/kg	SW8081	Aldrin	22		11	U	1.1	U	2.1		200	U
ug/kg	SW8081	alpha-BHC	1.8	U	2.6	J	1.1	U	0.46	U	200	U
ug/kg	SW8081	alpha-Chlordane	1.8	U	11	U	1.1	U	0.46	U	200	U
ug/kg	SW8081	beta-BHC	1.8	U	11	U	1.1	U	1		200	U
ug/kg	SW8081	delta-BHC	6.8	J	11	U	1.1	U	0.46	U	200	U
ug/kg	SW8081	Dieldrin	1.8	U	26		2.3	J	2.4	J	200	U
ug/kg	SW8081	Endosulfan I	1.8	U	11	U	1.1	U	0.46	U	200	U
ug/kg	SW8081	Endosulfan II	1.8	U	11	U	1.1	U	0.46	U	200	U
ug/kg	SW8081	Endosulfan sulfate	1.8	U	11	U	1.1	U	0.18	J	200	U
ug/kg	SW8081	Endrin	23		11	U	1	J	1.2		200	U
ug/kg	SW8081	Endrin aldehyde	1.8	U	11	U	1.1	U	0.46	U	200	U
ug/kg	SW8081	Endrin ketone	2.1		11	U	1.4		1.2	J	200	U
ug/kg	SW8081	gamma-BHC (Lindane)	1.1	J	11	U	0.65	J	0.7		200	U
ug/kg	SW8081	gamma-Chlordane	23		11	U	1.1	U	1.4	J	130	J
ug/kg	SW8081	Heptachlor	8.7	J	11	U	1.1	U	0.17	J	200	U
ug/kg	SW8081	Heptachlor epoxide	37		11	U	1.1	U	0.87	J	200	U
ug/kg	SW8081	Methoxychlor	3.6	U	22	U	2.3	U	0.92	U	400	U
ug/kg	SW8081	Toxaphene	72	U	430	U	46	U	18	U	7900	U

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mg/kg - milligram per kilogram

% = percent

TABLE 3 - FINAL RESULTS
DATA VALIDATION SUMMARY REPORT
JULY 2010 SEDIMENT AND SOIL SAMPLES
HONEYWELL – CLAYMONT
CLAYMONT, DELAWARE

		Field Sample ID	SP-3 7/7/10		SP-4 7/7/10		SP-5 7/7/10		SP-6 7/7/10		SP-7 7/7/10	
		Location	SP-3		SP-4		SP-5		SP-6		SP-7	
		Sample Date	7/7/2010		7/7/2010		7/7/2010		7/7/2010		7/7/2010	
		Sample Purpose	Regular sample		Regular sample		Regular sample		Regular sample		Regular sample	
		Sample Type	Soil sample - General		Soil sample - General		Soil sample - General		Soil sample - General		Soil sample - General	
Lab Units	Analytical Method	Parameter Name	result	qual	result	qual	result	qual	result	qual	result	qual
%	SM2540G	Percent Solids	86		90.1		77.6		87.1		97.1	
mg/kg	Lloyd Kahn	TOC	210000		2760		3350		94700		45900	
mg/kg	SW6020A	Arsenic	84		179		159		94.1		37.5	
mg/kg	SW6020A	Lead	314		1230		250		323		477	
ug/kg	SW8081	4,4'-DDD	1600		62		370		550		310	
ug/kg	SW8081	4,4'-DDE	1400		87		140		740		790	
ug/kg	SW8081	4,4'-DDT	4500		250		850		1000		1100	
ug/kg	SW8081	Aldrin	96	U	9.2	U	21	U	19	U	230	
ug/kg	SW8081	alpha-BHC	96	U	1.7	J	21	U	19	U	17	U
ug/kg	SW8081	alpha-Chlordane	96	U	9.2	U	21	U	19	U	9	J
ug/kg	SW8081	beta-BHC	96	U	9.2	U	21	U	5.6	J	17	U
ug/kg	SW8081	delta-BHC	96	U	9.2	U	21	U	19	U	17	U
ug/kg	SW8081	Dieldrin	490		9.2	U	6.4	J	90		17	U
ug/kg	SW8081	Endosulfan I	96	U	9.2	U	21	U	19	U	17	U
ug/kg	SW8081	Endosulfan II	96	U	9.2	U	21	U	19	U	17	U
ug/kg	SW8081	Endosulfan sulfate	96	U	9.2	U	21	U	19	U	17	U
ug/kg	SW8081	Endrin	740		65		21	U	140		220	
ug/kg	SW8081	Endrin aldehyde	96	U	9.2	U	21	U	19	U	17	U
ug/kg	SW8081	Endrin ketone	96	U	9.2	U	21	U	17	J	9.7	J
ug/kg	SW8081	gamma-BHC (Lindane)	96	U	9.2	U	21	U	6.3	J	17	U
ug/kg	SW8081	gamma-Chlordane	36		9.2	U	21	U	16	J	180	J
ug/kg	SW8081	Heptachlor	96	U	9.2	U	21	U	19	U	61	J
ug/kg	SW8081	Heptachlor epoxide	96	U	9.2	U	21	U	19	U	280	
ug/kg	SW8081	Methoxychlor	190	U	18	U	43	U	38	U	34	U
ug/kg	SW8081	Toxaphene	3800	U	370	U	860	U	770	U	690	U

Notes:

U = Not detected

J = Analyte present at a value that may not be accurate or precise

B = Not detected substantially above the level reported in the lab blanks

ug/kg = microgram per kilogram

mg/kg - milligram per kilogram

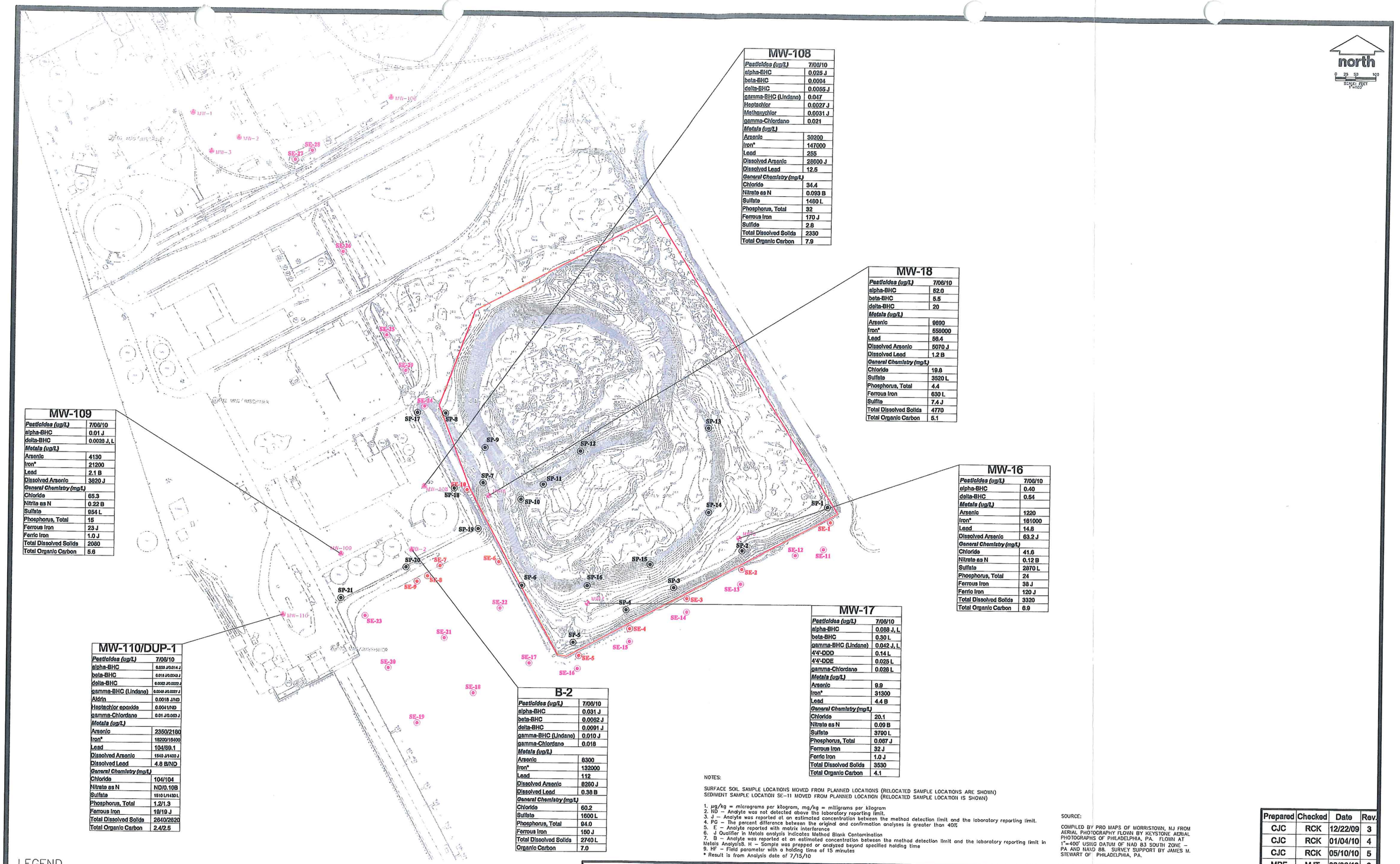
% = percent

TABLE 3 - FINAL RESULTS
DATA VALIDATION SUMMARY REPORT
JULY 2010 SEDIMENT AND SOIL SAMPLES
HONEYWELL – CLAYMONT
CLAYMONT, DELAWARE

		Field Sample ID	SP-8 7/7/10		SP-9 7/7/10	
		Location	SP-8		SP-9	
		Sample Date	7/7/2010		7/7/2010	
		Sample Purpose	Regular sample		Regular sample	
		Sample Type	Soil sample - General		Soil sample - General	
Lab Units	Analytical Method	Parameter Name	result	qual	result	qual
%	SM2540G	Percent Solids	86.9		85.9	
mg/kg	Lloyd Kahn	TOC	121000		11700	
mg/kg	SW6020A	Arsenic	50.2		8.9	
mg/kg	SW6020A	Lead	244		143	
ug/kg	SW8081	4,4'-DDD	300		17	
ug/kg	SW8081	4,4'-DDE	310		21	
ug/kg	SW8081	4,4'-DDT	500		63	
ug/kg	SW8081	Aldrin	19	U	0.97	U
ug/kg	SW8081	alpha-BHC	19	U	0.97	U
ug/kg	SW8081	alpha-Chlordane	19	U	0.97	U
ug/kg	SW8081	beta-BHC	19	U	0.97	U
ug/kg	SW8081	delta-BHC	19	U	0.97	U
ug/kg	SW8081	Dieldrin	92		4.4	
ug/kg	SW8081	Endosulfan I	19	U	0.97	U
ug/kg	SW8081	Endosulfan II	19	U	0.97	U
ug/kg	SW8081	Endosulfan sulfate	19	U	0.23	J
ug/kg	SW8081	Endrin	19	U	0.97	U
ug/kg	SW8081	Endrin aldehyde	19	U	0.97	U
ug/kg	SW8081	Endrin ketone	19	U	0.54	J
ug/kg	SW8081	gamma-BHC (Lindane)	19	U	0.4	J
ug/kg	SW8081	gamma-Chlordane	33		0.97	U
ug/kg	SW8081	Heptachlor	19	U	0.97	U
ug/kg	SW8081	Heptachlor epoxide	19	U	0.97	U
ug/kg	SW8081	Methoxychlor	38	U	1.9	U
ug/kg	SW8081	Toxaphene	760	U	39	U

Notes:
U = Not detected
J = Analyte present at a value that may not be accurate or precise
B = Not detected substantially above the level reported in the lab blanks
ug/kg = microgram per kilogram
mg/kg - milligram per kilogram
% = percent

Produced by:WHB 09/02/10
Checked by: TLC 09/02/10



MW-108

Pesticides (ug/L)	7/06/10
alpha-BHC	0.025 J
beta-BHC	0.0094
delta-BHC	0.0055 J
gamma-BHC (Lindane)	0.047
Heptachlor	0.0027 J
Methoxychlor	0.0031 J
gamma-Chlordane	0.021
Metals (ug/L)	
Arsenic	30200
Iron*	147000
Lead	255
Dissolved Arsenic	28600 J
Dissolved Lead	12.5
General Chemistry (mg/L)	
Chloride	34.4
Nitrate as N	0.093 B
Sulfate	1460 L
Phosphorus, Total	32
Ferrous Iron	170 J
Sulfide	2.8
Total Dissolved Solids	2330
Total Organic Carbon	7.9

MW-18

Pesticides (ug/L)	7/06/10
alpha-BHC	52.0
beta-BHC	5.5
delta-BHC	20
Metals (ug/L)	
Arsenic	9690
Iron*	558000
Lead	56.4
Dissolved Arsenic	5070 J
Dissolved Lead	1.2 B
General Chemistry (mg/L)	
Chloride	19.8
Sulfate	3520 L
Phosphorus, Total	4.4
Ferrous Iron	630 L
Sulfide	7.4 J
Total Dissolved Solids	4770
Total Organic Carbon	5.1

MW-109

Pesticides (ug/L)	7/06/10
alpha-BHC	0.01 J
delta-BHC	0.0020 J, L
Metals (ug/L)	
Arsenic	4130
Iron*	21200
Lead	2.1 B
Dissolved Arsenic	3820 J
General Chemistry (mg/L)	
Chloride	65.3
Nitrate as N	0.22 B
Sulfate	954 L
Phosphorus, Total	15
Ferrous Iron	23 J
Ferric Iron	1.0 J
Total Dissolved Solids	2080
Total Organic Carbon	5.6

MW-16

Pesticides (ug/L)	7/06/10
alpha-BHC	0.40
delta-BHC	0.54
Metals (ug/L)	
Arsenic	1220
Iron*	161000
Lead	14.8
Dissolved Arsenic	63.2 J
General Chemistry (mg/L)	
Chloride	41.6
Nitrate as N	0.12 B
Sulfate	2870 L
Phosphorus, Total	24
Ferrous Iron	38 J
Ferric Iron	120 J
Total Dissolved Solids	3320
Total Organic Carbon	6.9

MW-110/DUP-1

Pesticides (ug/L)	7/06/10
alpha-BHC	0.035 J/0.014 J
beta-BHC	0.018 J/0.0049 J
delta-BHC	0.0082 J/0.0029 J
gamma-BHC (Lindane)	0.0049 J/0.0027 J
Aldrin	0.0018 J/ND
Heptachlor epoxide	0.0041/ND
gamma-Chlordane	0.01 J/0.003 J
Metals (ug/L)	
Arsenic	2350/2160
Iron*	16200/16400
Lead	104/89.1
Dissolved Arsenic	1540 J/1420 J
Dissolved Lead	4.6 B/ND
General Chemistry (mg/L)	
Chloride	104/104
Nitrate as N	ND/0.10B
Sulfate	1510 L/1430 L
Phosphorus, Total	1.2/1.3
Ferrous Iron	19/19 J
Total Dissolved Solids	2640/2620
Total Organic Carbon	2.4/2.5

B-2

Pesticides (ug/L)	7/06/10
alpha-BHC	0.031 J
beta-BHC	0.0082 J
delta-BHC	0.0091 J
gamma-BHC (Lindane)	0.010 J
gamma-Chlordane	0.018
Metals (ug/L)	
Arsenic	8300
Iron*	132000
Lead	112
Dissolved Arsenic	8260 J
Dissolved Lead	0.38 B
General Chemistry (mg/L)	
Chloride	60.2
Sulfate	1600 L
Phosphorus, Total	94.0
Ferrous Iron	150 J
Total Dissolved Solids	2740 L
Organic Carbon	7.0

MW-17

Pesticides (ug/L)	7/06/10
alpha-BHC	0.068 J, L
beta-BHC	0.30 L
gamma-BHC (Lindane)	0.042 J, L
4'4'-DDD	0.14 L
4'4'-DDE	0.025 L
gamma-Chlordane	0.026 L
Metals (ug/L)	
Arsenic	9.9
Iron*	31300
Lead	4.4 B
General Chemistry (mg/L)	
Chloride	20.1
Nitrate as N	0.09 B
Sulfate	3790 L
Phosphorus, Total	0.067 J
Ferrous Iron	32 J
Ferric Iron	1.0 J
Total Dissolved Solids	3530
Total Organic Carbon	4.1

NOTES:

SURFACE SOIL SAMPLE LOCATIONS MOVED FROM PLANNED LOCATIONS (RELOCATED SAMPLE LOCATIONS ARE SHOWN)
SEDIMENT SAMPLE LOCATION SE-11 MOVED FROM PLANNED LOCATION (RELOCATED SAMPLE LOCATION IS SHOWN)

1. µg/kg = micrograms per kilogram, mg/kg = milligrams per kilogram
2. ND – Analyte was not detected above the laboratory reporting limit.
3. J – Analyte was reported at an estimated concentration between the method detection limit and the laboratory reporting limit.
4. PC – The percent difference between the original and confirmation analyses is greater than 40%
5. E – Analyte reported with matrix interference
6. J Qualifier in Metals analysis indicates Method Blank Contamination
7. B – Analyte was reported at an estimated concentration between the method detection limit and the laboratory reporting limit in Metals Analysis.
8. H – Sample was prepped or analyzed beyond specified holding time
9. HF – Field parameter with a holding time of 15 minutes

* Result is from Analysis date of 7/15/10

SOURCE:

COMPILED BY PRO MAPS OF MORRISTOWN, NJ FROM AERIAL PHOTOGRAPHY FLOWN BY KEYSTONE AERIAL PHOTOGRAPHS OF PHILADELPHIA, PA. FLOWN AT 1"=400' USING DATUM OF NAD 83 SOUTH ZONE – PA AND NAVD 88. SURVEY SUPPORT BY JAMES M. STEWART OF PHILADELPHIA, PA.

Prepared	Checked	Date	Rev.
CJC	RCK	12/22/09	3
CJC	RCK	01/04/10	4
CJC	RCK	05/10/10	5
MDF	MJT	08/06/10	6

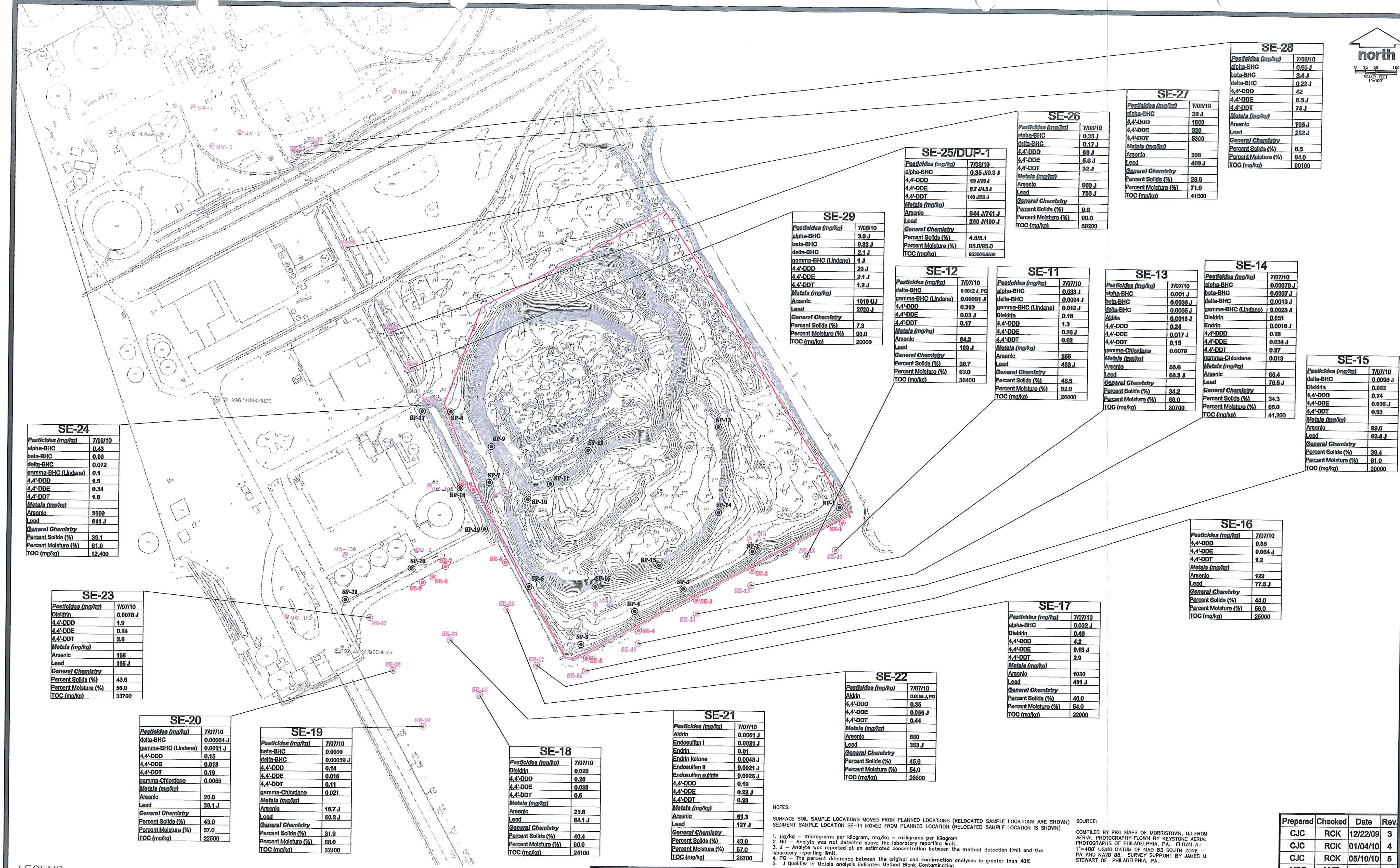
LEGEND

- APPROXIMATE EXTENT OF SOLID WASTE MANAGEMENT UNIT (SWMU)
- EXISTING MONITORING WELLS
- SP-1 JULY 2010 SURFACE SOIL SAMPLE LOCATION– ANALYZED FOR PESTICIDES, ARSENIC AND LEAD.
- SE-1 EXISTING DELAWARE RIVER SEDIMENT SAMPLE LOCATION – ANALYZED FOR DDX, ARSENIC AND LEAD.
- SE-11 JULY 2010 SEDIMENT SAMPLE LOCATION – ANALYZED FOR PESTICIDES, ARSENIC AND LEAD.

MACTEC CUMMINGS RITER CONSULTANTS, INC.

GROUNDWATER SAMPLE RESULTS SUMMARY PLAN

MACTEC Project 3466-09-0698



SE-28

Pesticides (mg/kg)	7/08/10
alpha-BHC	0.65 J
beta-BHC	2.4 J
delta-BHC	0.22 J
4,4'-DDD	42
4,4'-DDE	6.3 J
4,4'-DDT	74 J
Metals (mg/kg)	
Arsenic	785 J
Lead	282 J
General Chemistry	
Percent Solids (%)	6.5
Percent Moisture (%)	94.0
TOC (mg/kg)	60100

SE-27

Pesticides (mg/kg)	7/08/10
alpha-BHC	38 J
4,4'-DDD	1600
4,4'-DDE	220
4,4'-DDT	5300
Metals (mg/kg)	
Arsenic	396
Lead	408 J
General Chemistry	
Percent Solids (%)	28.9
Percent Moisture (%)	71.0
TOC (mg/kg)	41500

SE-26

Pesticides (mg/kg)	7/08/10
alpha-BHC	0.35 J
delta-BHC	0.17 J
4,4'-DDD	66 J
4,4'-DDE	5.8 J
4,4'-DDT	32 J
Metals (mg/kg)	
Arsenic	960 J
Lead	738 J
General Chemistry	
Percent Solids (%)	9.6
Percent Moisture (%)	90.0
TOC (mg/kg)	58200

SE-25/DUP-1

Pesticides (mg/kg)	7/08/10
alpha-BHC	0.35 J/0.3 J
4,4'-DDD	68 J/58 J
4,4'-DDE	8.7 J/4.5 J
4,4'-DDT	140 J/89 J
Metals (mg/kg)	
Arsenic	944 J/741 J
Lead	260 J/190 J
General Chemistry	
Percent Solids (%)	4.5/5.1
Percent Moisture (%)	95.0/95.0
TOC (mg/kg)	93300/58500

SE-29

Pesticides (mg/kg)	7/08/10
alpha-BHC	3.9 J
beta-BHC	0.32 J
delta-BHC	2.1 J
gamma-BHC (Lindane)	1 J
4,4'-DDD	23 J
4,4'-DDE	2.1 J
4,4'-DDT	1.2 J
Metals (mg/kg)	
Arsenic	1010 UJ
Lead	2020 J
General Chemistry	
Percent Solids (%)	7.3
Percent Moisture (%)	93.0
TOC (mg/kg)	20000

SE-12

Pesticides (mg/kg)	7/07/10
delta-BHC	0.0012 J, PG
gamma-BHC (Lindane)	0.00091 J
4,4'-DDD	0.310
4,4'-DDE	0.03 J
4,4'-DDT	0.17
Metals (mg/kg)	
Arsenic	84.2
Lead	100 J
General Chemistry	
Percent Solids (%)	38.7
Percent Moisture (%)	63.0
TOC (mg/kg)	36400

SE-11

Pesticides (mg/kg)	7/07/10
alpha-BHC	0.033 J
delta-BHC	0.0094 J
gamma-BHC (Lindane)	0.012 J
Dieldrin	0.18
4,4'-DDD	1.3
4,4'-DDE	0.28 J
4,4'-DDT	0.62
Metals (mg/kg)	
Arsenic	255
Lead	488 J
General Chemistry	
Percent Solids (%)	48.5
Percent Moisture (%)	52.0
TOC (mg/kg)	26800

SE-13

Pesticides (mg/kg)	7/07/10
alpha-BHC	0.001 J
beta-BHC	0.0036 J
delta-BHC	0.0035 J
Aldrin	0.0018 J
4,4'-DDD	0.24
4,4'-DDE	0.017 J
4,4'-DDT	0.15
gamma-Chlordane	0.0079
Metals (mg/kg)	
Arsenic	56.6
Lead	69.3 J
General Chemistry	
Percent Solids (%)	34.2
Percent Moisture (%)	66.0
TOC (mg/kg)	30700

SE-14

Pesticides (mg/kg)	7/07/10
alpha-BHC	0.00079 J
beta-BHC	0.0037 J
delta-BHC	0.0013 J
gamma-BHC (Lindane)	0.0023 J
Dieldrin	0.051
Endrin	0.0016 J
4,4'-DDD	0.28
4,4'-DDE	0.034 J
4,4'-DDT	0.27
gamma-Chlordane	0.013
Metals (mg/kg)	
Arsenic	86.4
Lead	76.5 J
General Chemistry	
Percent Solids (%)	34.3
Percent Moisture (%)	66.0
TOC (mg/kg)	41,200

SE-15

Pesticides (mg/kg)	7/07/10
delta-BHC	0.0095 J
Dieldrin	0.062
4,4'-DDD	0.74
4,4'-DDE	0.036 J
4,4'-DDT	0.93
Metals (mg/kg)	
Arsenic	89.0
Lead	69.4 J
General Chemistry	
Percent Solids (%)	39.4
Percent Moisture (%)	61.0
TOC (mg/kg)	30000

SE-24

Pesticides (mg/kg)	7/08/10
alpha-BHC	0.43
beta-BHC	0.06
delta-BHC	0.072
gamma-BHC (Lindane)	0.1
4,4'-DDD	1.5
4,4'-DDE	0.34
4,4'-DDT	1.6
Metals (mg/kg)	
Arsenic	3500
Lead	611 J
General Chemistry	
Percent Solids (%)	39.1
Percent Moisture (%)	61.0
TOC (mg/kg)	12,400

SE-16

Pesticides (mg/kg)	7/07/10
4,4'-DDD	0.85
4,4'-DDE	0.064 J
4,4'-DDT	1.2
Metals (mg/kg)	
Arsenic	129
Lead	77.5 J
General Chemistry	
Percent Solids (%)	44.0
Percent Moisture (%)	56.0
TOC (mg/kg)	25900

SE-23

Pesticides (mg/kg)	7/07/10
Dieldrin	0.0078 J
4,4'-DDD	1.9
4,4'-DDE	0.24
4,4'-DDT	2.6
Metals (mg/kg)	
Arsenic	165
Lead	165 J
General Chemistry	
Percent Solids (%)	43.6
Percent Moisture (%)	56.0
TOC (mg/kg)	33700

SE-17

Pesticides (mg/kg)	7/07/10
alpha-BHC	0.032 J
Dieldrin	0.46
4,4'-DDD	4.2
4,4'-DDE	0.18 J
4,4'-DDT	2.9
Metals (mg/kg)	
Arsenic	1050
Lead	481 J
General Chemistry	
Percent Solids (%)	46.0
Percent Moisture (%)	54.0
TOC (mg/kg)	22900

SE-22

Pesticides (mg/kg)	7/07/10
Aldrin	0.0055 J, PG
4,4'-DDD	0.35
4,4'-DDE	0.055 J
4,4'-DDT	0.44
Metals (mg/kg)	
Arsenic	860
Lead	353 J
General Chemistry	
Percent Solids (%)	45.6
Percent Moisture (%)	54.0
TOC (mg/kg)	26600

SE-20

Pesticides (mg/kg)	7/07/10
delta-BHC	0.00064 J
gamma-BHC (Lindane)	0.0021 J
4,4'-DDD	0.15
4,4'-DDE	0.013
4,4'-DDT	0.19
gamma-Chlordane	0.0055
Metals (mg/kg)	
Arsenic	20.0
Lead	38.1 J
General Chemistry	
Percent Solids (%)	43.0
Percent Moisture (%)	57.0
TOC (mg/kg)	22500

SE-19

Pesticides (mg/kg)	7/07/10
beta-BHC	0.0039
delta-BHC	0.00059 J
4,4'-DDD	0.14
4,4'-DDE	0.016
4,4'-DDT	0.11
gamma-Chlordane	0.021
Metals (mg/kg)	
Arsenic	16.7 J
Lead	50.2 J
General Chemistry	
Percent Solids (%)	31.9
Percent Moisture (%)	68.0
TOC (mg/kg)	32400

SE-18

Pesticides (mg/kg)	7/07/10
Dieldrin	0.028
4,4'-DDD	0.26
4,4'-DDE	0.038
4,4'-DDT	0.5
Metals (mg/kg)	
Arsenic	25.8
Lead	64.1 J
General Chemistry	
Percent Solids (%)	40.4
Percent Moisture (%)	60.0
TOC (mg/kg)	24100

SE-21

Pesticides (mg/kg)	7/07/10
Aldrin	0.0061 J
Endosulfan I	0.0021 J
Endrin	0.01
Endrin ketone	0.0043 J
Endosulfan II	0.0021 J
Endosulfan sulfate	0.0026 J
4,4'-DDD	0.19
4,4'-DDE	0.22 J
4,4'-DDT	0.23
Metals (mg/kg)	
Arsenic	61.3
Lead	127 J
General Chemistry	
Percent Solids (%)	43.0
Percent Moisture (%)	57.0
TOC (mg/kg)	26700

NOTES:

SURFACE SOIL SAMPLE LOCATIONS MOVED FROM PLANNED LOCATIONS (RELOCATED SAMPLE LOCATIONS ARE SHOWN)
SEDIMENT SAMPLE LOCATION SE-11 MOVED FROM PLANNED LOCATION (RELOCATED SAMPLE LOCATION IS SHOWN)

1. µg/kg = micrograms per kilogram, mg/kg = milligrams per kilogram
2. ND – Analyte was not detected above the laboratory reporting limit.
3. J – Analyte was reported at an estimated concentration between the method detection limit and the laboratory reporting limit.
4. PG – The percent difference between the original and confirmation analyses is greater than 40%
5. J Qualifier in Metals analysis indicates Method Blank Contamination

SOURCE:

COMPILED BY PRO MAPS OF MORRISTOWN, NJ FROM AERIAL PHOTOGRAPHY FLOWN BY KEYSTONE AERIAL PHOTOGRAPHS OF PHILADELPHIA, PA. FLOWN AT 1"=400' USING DATUM OF NAD 83 SOUTH ZONE – PA AND NAVD 88. SURVEY SUPPORT BY JAMES M. STEWART OF PHILADELPHIA, PA.

Prepared	Checked	Date	Rev.
CJC	RCK	12/22/09	3
CJC	RCK	01/04/10	4
CJC	RCK	05/10/10	5
MDF	MJT	08/05/10	6

LEGEND

APPROXIMATE EXTENT OF SOLID WASTE MANAGEMENT UNIT (SWMU)

EXISTING MONITORING WELLS

SP-1 JULY 2010 SURFACE SOIL SAMPLE LOCATION– ANALYZED FOR PESTICIDES, ARSENIC AND LEAD.

SE-1 EXISTING DELAWARE RIVER SEDIMENT SAMPLE LOCATION – ANALYZED FOR DDX, ARSENIC AND LEAD.

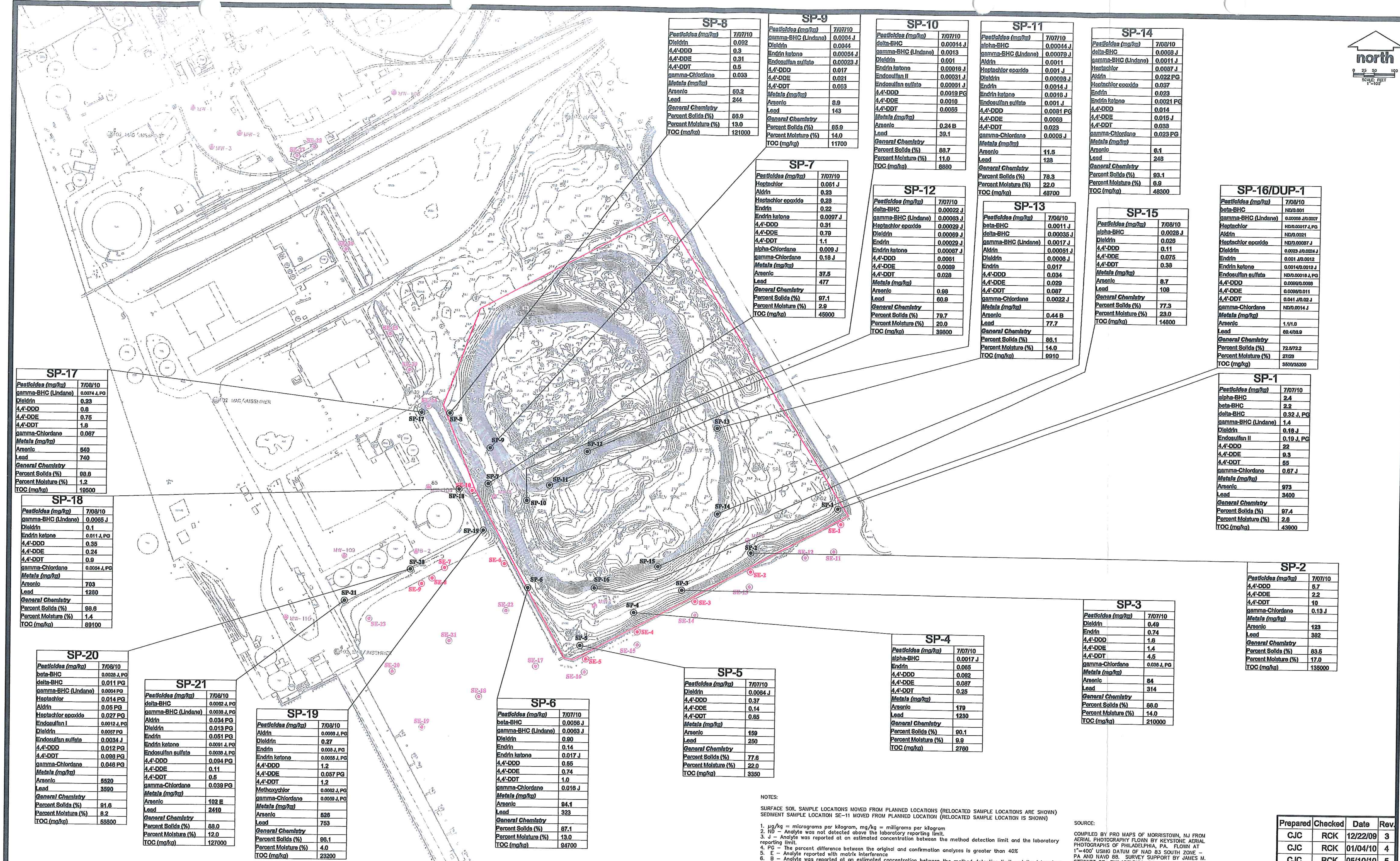
SE-11 JULY 2010 SEDIMENT SAMPLE LOCATION – ANALYZED FOR PESTICIDES, ARSENIC AND LEAD.

MACTEC

CUMMINGS RITER CONSULTANTS, INC.

SEDIMENT SAMPLE RESULTS SUMMARY PLAN

MACTEC Project 3465-09-0358



SP-8

Pesticides (mg/kg)	7/07/10
Dieldrin	0.092
4,4'-DDD	0.3
4,4'-DDE	0.31
4,4'-DDT	0.5
gamma-Chlordane	0.033
Metals (mg/kg)	
Arsenic	50.2
Lead	244
General Chemistry	
Percent Solids (%)	86.9
Percent Moisture (%)	13.0
TOC (mg/kg)	121000

SP-9

Pesticides (mg/kg)	7/07/10
gamma-BHC (Lindane)	0.0004 J
Dieldrin	0.0044
Endrin ketone	0.00054 J
Endosulfan sulfate	0.00023 J
4,4'-DDD	0.017
4,4'-DDE	0.021
4,4'-DDT	0.063
Metals (mg/kg)	
Arsenic	8.9
Lead	143
General Chemistry	
Percent Solids (%)	85.9
Percent Moisture (%)	14.0
TOC (mg/kg)	11700

SP-10

Pesticides (mg/kg)	7/07/10
delta-BHC	0.00014 J
gamma-BHC (Lindane)	0.0013
Dieldrin	0.001
Endrin ketone	0.00016 J
Endosulfan II	0.00031 J
Endosulfan sulfate	0.00061 J
4,4'-DDD	0.0019 PG
4,4'-DDE	0.0016
4,4'-DDT	0.0056
Metals (mg/kg)	
Arsenic	0.24 B
Lead	39.1
General Chemistry	
Percent Solids (%)	88.7
Percent Moisture (%)	11.0
TOC (mg/kg)	8880

SP-11

Pesticides (mg/kg)	7/07/10
alpha-BHC	0.00044 J
gamma-BHC (Lindane)	0.00079 J
Aldrin	0.0011
Heptachlor epoxide	0.001 J
Dieldrin	0.00098 J
Endrin	0.0014 J
Endrin ketone	0.0016 J
Endosulfan sulfate	0.001 J
4,4'-DDD	0.0081 PG
4,4'-DDE	0.0068
4,4'-DDT	0.023
gamma-Chlordane	0.0005 J
Metals (mg/kg)	
Arsenic	11.5
Lead	128
General Chemistry	
Percent Solids (%)	78.3
Percent Moisture (%)	22.0
TOC (mg/kg)	48700

SP-14

Pesticides (mg/kg)	7/08/10
delta-BHC	0.0068 J
gamma-BHC (Lindane)	0.0011 J
Heptachlor	0.0087 J
Aldrin	0.022 PG
Heptachlor epoxide	0.037
Endrin	0.023
Endrin ketone	0.0021 PG
4,4'-DDD	0.014
4,4'-DDE	0.015 J
4,4'-DDT	0.038
gamma-Chlordane	0.023 PG
Metals (mg/kg)	
Arsenic	6.1
Lead	248
General Chemistry	
Percent Solids (%)	93.1
Percent Moisture (%)	6.9
TOC (mg/kg)	48300

north

0 25 50 100

SCALE: FEET 1"=100'

SP-7

Pesticides (mg/kg)	7/07/10
Heptachlor	0.061 J
Aldrin	0.23
Heptachlor epoxide	0.28
Endrin	0.22
Endrin ketone	0.0097 J
4,4'-DDD	0.31
4,4'-DDE	0.79
4,4'-DDT	1.1
alpha-Chlordane	0.009 J
gamma-Chlordane	0.18 J
Metals (mg/kg)	
Arsenic	37.5
Lead	477
General Chemistry	
Percent Solids (%)	97.1
Percent Moisture (%)	2.9
TOC (mg/kg)	45900

SP-12

Pesticides (mg/kg)	7/07/10
delta-BHC	0.00022 J
gamma-BHC (Lindane)	0.00063 J
Heptachlor epoxide	0.00029 J
Dieldrin	0.00069 J
Endrin	0.00029 J
Endrin ketone	0.00067 J
4,4'-DDD	0.0061
4,4'-DDE	0.0069
4,4'-DDT	0.028
Metals (mg/kg)	
Arsenic	0.98
Lead	60.9
General Chemistry	
Percent Solids (%)	79.7
Percent Moisture (%)	20.0
TOC (mg/kg)	39800

SP-13

Pesticides (mg/kg)	7/08/10
beta-BHC	0.0011 J
delta-BHC	0.00035 J
gamma-BHC (Lindane)	0.0017 J
Aldrin	0.00051 J
Dieldrin	0.0006 J
Endrin	0.017
4,4'-DDD	0.034
4,4'-DDE	0.029
4,4'-DDT	0.087
gamma-Chlordane	0.0022 J
Metals (mg/kg)	
Arsenic	0.44 B
Lead	77.7
General Chemistry	
Percent Solids (%)	86.1
Percent Moisture (%)	14.0
TOC (mg/kg)	9910

SP-15

Pesticides (mg/kg)	7/08/10
alpha-BHC	0.0028 J
Dieldrin	0.026
4,4'-DDD	0.11
4,4'-DDE	0.075
4,4'-DDT	0.38
Metals (mg/kg)	
Arsenic	8.7
Lead	108
General Chemistry	
Percent Solids (%)	77.3
Percent Moisture (%)	23.0
TOC (mg/kg)	14800

SP-16/DUP-1

Pesticides (mg/kg)	7/08/10
beta-BHC	ND/0.001
gamma-BHC (Lindane)	0.00066 J/0.0007
Heptachlor	ND/0.00017 J, PG
Aldrin	ND/0.0021
Heptachlor epoxide	ND/0.00087 J
Dieldrin	0.0023 J/0.0024 J
Endrin	0.001 J/0.0012
Endrin ketone	0.0014/0.0012 J
Endosulfan sulfate	ND/0.00018 J, PG
4,4'-DDD	0.0099/0.0066
4,4'-DDE	0.0095/0.011
4,4'-DDT	0.041 J/0.02 J
gamma-Chlordane	ND/0.0014 J
Metals (mg/kg)	
Arsenic	1.1/1.0
Lead	69.4/68.9
General Chemistry	
Percent Solids (%)	72.5/72.2
Percent Moisture (%)	27/28
TOC (mg/kg)	3500/35200

SP-1

Pesticides (mg/kg)	7/07/10
alpha-BHC	2.4
beta-BHC	2.2
delta-BHC	0.32 J, PG
gamma-BHC (Lindane)	1.4
Dieldrin	0.18 J
Endosulfan II	0.19 J, PG
4,4'-DDD	22
4,4'-DDE	9.3
4,4'-DDT	55
gamma-Chlordane	0.67 J
Metals (mg/kg)	
Arsenic	973
Lead	3400
General Chemistry	
Percent Solids (%)	97.4
Percent Moisture (%)	2.6
TOC (mg/kg)	43900

SP-17

Pesticides (mg/kg)	7/08/10
gamma-BHC (Lindane)	0.0074 J, PG
Dieldrin	0.23
4,4'-DDD	0.8
4,4'-DDE	0.75
4,4'-DDT	1.8
gamma-Chlordane	0.067
Metals (mg/kg)	
Arsenic	540
Lead	740
General Chemistry	
Percent Solids (%)	98.8
Percent Moisture (%)	1.2
TOC (mg/kg)	19500

SP-18

Pesticides (mg/kg)	7/08/10
gamma-BHC (Lindane)	0.0065 J
Dieldrin	0.1
Endrin ketone	0.011 J, PG
4,4'-DDD	0.35
4,4'-DDE	0.24
4,4'-DDT	0.9
gamma-Chlordane	0.0054 J, PG
Metals (mg/kg)	
Arsenic	703
Lead	1280
General Chemistry	
Percent Solids (%)	98.6
Percent Moisture (%)	1.4
TOC (mg/kg)	89100

SP-2

Pesticides (mg/kg)	7/07/10
4,4'-DDD	5.7
4,4'-DDE	2.2
4,4'-DDT	10
gamma-Chlordane	0.13 J
Metals (mg/kg)	
Arsenic	123
Lead	382
General Chemistry	
Percent Solids (%)	83.5
Percent Moisture (%)	17.0
TOC (mg/kg)	135000

SP-3

Pesticides (mg/kg)	7/07/10
Dieldrin	0.49
Endrin	0.74
4,4'-DDD	1.6
4,4'-DDE	1.4
4,4'-DDT	4.5
gamma-Chlordane	0.038 J, PG
Metals (mg/kg)	
Arsenic	84
Lead	314
General Chemistry	
Percent Solids (%)	86.0
Percent Moisture (%)	14.0
TOC (mg/kg)	210000

SP-4

Pesticides (mg/kg)	7/07/10
alpha-BHC	0.0017 J
Endrin	0.065
4,4'-DDD	0.062
4,4'-DDE	0.087
4,4'-DDT	0.25
Metals (mg/kg)	
Arsenic	179
Lead	1230
General Chemistry	
Percent Solids (%)	90.1
Percent Moisture (%)	9.9
TOC (mg/kg)	2760

SP-5

Pesticides (mg/kg)	7/07/10
Dieldrin	0.0084 J
4,4'-DDD	0.37
4,4'-DDE	0.14
4,4'-DDT	0.65
Metals (mg/kg)	
Arsenic	159
Lead	250
General Chemistry	
Percent Solids (%)	77.6
Percent Moisture (%)	22.0
TOC (mg/kg)	3350

SP-6

Pesticides (mg/kg)	7/07/10
beta-BHC	0.0056 J
gamma-BHC (Lindane)	0.0063 J
Dieldrin	0.90
Endrin	0.14
Endrin ketone	0.017 J
4,4'-DDD	0.55
4,4'-DDE	0.74
4,4'-DDT	1.0
gamma-Chlordane	0.016 J
Metals (mg/kg)	
Arsenic	94.1
Lead	323
General Chemistry	
Percent Solids (%)	87.1
Percent Moisture (%)	13.0
TOC (mg/kg)	94700

SP-20

Pesticides (mg/kg)	7/08/10
beta-BHC	0.0028 J, PG
delta-BHC	0.011 PG
gamma-BHC (Lindane)	0.0084 PG
Heptachlor	0.014 PG
Aldrin	0.05 PG
Heptachlor epoxide	0.027 PG
Endosulfan I	0.0012 J, PG
Dieldrin	0.0057 PG
Endosulfan sulfate	0.0034 J
4,4'-DDD	0.012 PG
4,4'-DDT	0.096 PG
gamma-Chlordane	0.046 PG
Metals (mg/kg)	
Arsenic	5520
Lead	3590
General Chemistry	
Percent Solids (%)	91.6
Percent Moisture (%)	8.2
TOC (mg/kg)	58800

SP-21

Pesticides (mg/kg)	7/08/10
delta-BHC	0.0082 J, PG
gamma-BHC (Lindane)	0.0038 J, PG
Aldrin	0.034 PG
Dieldrin	0.013 PG
Endrin	0.051 PG
Endrin ketone	0.0091 J, PG
Endosulfan sulfate	0.0038 J, PG
4,4'-DDD	0.094 PG
4,4'-DDE	0.11
4,4'-DDT	0.5
gamma-Chlordane	0.039 PG
Metals (mg/kg)	
Arsenic	102 E
Lead	2410
General Chemistry	
Percent Solids (%)	88.0
Percent Moisture (%)	12.0
TOC (mg/kg)	127000

SP-19

Pesticides (mg/kg)	7/08/10
Aldrin	0.0068 J, PG
Dieldrin	0.27
Endrin	0.008 J, PG
Endrin ketone	0.0055 J, PG
4,4'-DDD	1.2
4,4'-DDE	0.057 PG
4,4'-DDT	1.2
Methoxychlor	0.0082 J, PG
gamma-Chlordane	0.0059 J, PG
Metals (mg/kg)	
Arsenic	526
Lead	753
General Chemistry	
Percent Solids (%)	96.1
Percent Moisture (%)	4.0
TOC (mg/kg)	23200

NOTES:

SURFACE SOIL SAMPLE LOCATIONS MOVED FROM PLANNED LOCATIONS (RELOCATED SAMPLE LOCATIONS ARE SHOWN)
SEDIMENT SAMPLE LOCATION SE-11 MOVED FROM PLANNED LOCATION (RELOCATED SAMPLE LOCATION IS SHOWN)

1. µg/kg = micrograms per kilogram, mg/kg = milligrams per kilogram
2. ND – Analyte was not detected above the laboratory reporting limit.
3. J – Analyte was reported at an estimated concentration between the method detection limit and the laboratory reporting limit.
4. PG – The percent difference between the original and confirmation analyses is greater than 40%
5. E – Analyte reported with matrix interference
6. B – Analyte was reported at an estimated concentration between the method detection limit and the laboratory reporting limit in Metals Analysis

SOURCE:

COMPILED BY PRO MAPS OF MORRISTOWN, NJ FROM AERIAL PHOTOGRAPHY FLOWN BY KEYSTONE AERIAL PHOTOGRAPHS OF PHILADELPHIA, PA. FLOWN AT 1"=400' USING DATUM OF NAD 83 SOUTH ZONE – PA AND NAVD 88. SURVEY SUPPORT BY JAMES M. STEWART OF PHILADELPHIA, PA.

Prepared	Checked	Date	Rev.
CJC	RCK	12/22/09	3
CJC	RCK	01/04/10	4
CJC	RCK	05/10/10	5
MDF	MJT	08/05/10	6

LEGEND

- APPROXIMATE EXTENT OF SOLID WASTE MANAGEMENT UNIT (SWMU)
- EXISTING MONITORING WELLS
- SP-1 — JULY 2010 SURFACE SOIL SAMPLE LOCATION– ANALYZED FOR PESTICIDES, ARSENIC AND LEAD.
- SE-1 — EXISTING DELAWARE RIVER SEDIMENT SAMPLE LOCATION – ANALYZED FOR DDX, ARSENIC AND LEAD.
- SE-11 — JULY 2010 SEDIMENT SAMPLE LOCATION – ANALYZED FOR PESTICIDES, ARSENIC AND LEAD.

MACTEC CUMMINGS RITER CONSULTANTS, INC.

SOIL SAMPLE RESULTS SUMMARY PLAN

MACTEC Project 3465-09-0368

APPENDIX B: 2015 ADDITIONAL SOIL INVESTIGATION REPORT

COMMITMENT & INTEGRITY
DRIVE RESULTS

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Pittsburgh, Pennsylvania 15235
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T 800.883.3266
T 412.241.4500
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December 22, 2015

Mr. Russell H. Fish
Office of Remediation 3LC20
U.S. Environmental Protection Agency
1650 Arch Street
Philadelphia, PA 19103-2029

Re: Data Report – Supplemental Soil Investigation
Chemtrade Solutions LLC
Claymont, Delaware

Dear Mr. Fish:

On behalf of Chemtrade Solutions LLC (Chemtrade), Woodard & Curran is submitting this data report summarizing the results of supplemental soil investigation activities performed in support of the presumptive redevelopment remedy for the southern portion of the South Plant of the Delaware Valley Works in Claymont, Delaware. The supplemental soil investigation was completed as outlined in the work plan for Supplemental investigation of Soils dated November 13, 2015 and the revised plan submitted to the U.S. Environmental Protection Agency (USEPA) on December 1, 2015. USEPA approved the revised plan on December 8, 2015.

Sampling and testing procedures were consistent with those employed for the Phase 2 RCRA facility investigation (RFI) as described in Chapter 2 of the RFI Phase 2 Report, Delaware Valley Works, South Plant dated June 20, 2007. The purpose of the supplemental soils investigation was to assess arsenic levels in soils at twenty locations to determine the area of the presumptive redevelopment remedy that will contain low permeability components.

Based on the results presented in this data report, a low-permeability cap would seem necessary and appropriate for areas proposed to be capped in the report entitled *Resource Conservation and Recovery Act Facility Investigation (RFI) Summary and Presumptive Remedy for Proposed Industrial Redevelopment Area* (RFI Summary Report) dated October 21, 2015.

Certification Statement

The certification statement for this data report is provided in Attachment A. The data report is certified in accordance with Section XIII of the Administrative Order (Ref: Docket No. RCRA-3-0889CA).

Description of Field Activities and Laboratory Testing

The supplemental soil boring locations are presented on Figure 1. Each boring was advanced using direct-push drilling techniques. The direct-push borings were advanced by a Delaware-licensed driller and logged by a geologist. Direct-push sampling probes were advanced to the water table at each location, and up to three soil samples were selected from each boring for laboratory analysis for arsenic. The locations and elevations of each boring location were surveyed by a Delaware-licensed surveyor. The depth to the water table was recorded on the soil boring logs that are included in Attachment B.

Based on actual sample recovery and the depth to the water table, two to three soil samples from each boring were selected for laboratory analysis for arsenic. One sample was comprised of surface soil that represents the approximate depth interval of 0 to 2 feet below ground surface (bgs). An additional sample from each boring was comprised from the recovered sample core interval believed to represent soils from 1 to 3 feet above the encountered water table. Based on the observed thickness of the vadose zone and actual sample recovery that was achieved, a third sample located (vertically) approximately at the midpoint of the vadose zone was also collected (as practical) and analyzed. Soil sample collection forms are also included in Attachment B.

Soil samples were analyzed for arsenic using USEPA Method 6020A by Test America of Pittsburgh, Pennsylvania.

Data Summary

The water table was encountered at the locations of the soil borings from 4 to 8 feet bgs. Water table elevations are summarized in Table 1.

Based on the boring logs from the soil borings, the surficial fill material that was encountered consists primarily of sandy clay, with rock, brick, and concrete fragments, with some cinders. Tan to gray clay was encountered below this material. Red to purple staining was observed at the following soil boring locations: SSI-5, SSI-13, SSI-14, SSI-16, SSI-18, SSI-19, and SSI-20. Red to purple staining was observed in the surficial fill material in soil borings SSI-5, SSI-13, SSI-14, SSI-16 and SSI-18. Red to purple staining was observed in the underlying clay unit in soil borings SSI-14, SSI-19, and SSI-20.

Arsenic results are summarized in Table 2 and depicted in plan view on Figure 2. Laboratory data packages are included in Attachment C. Arsenic was detected in the soil samples that were analyzed at concentrations ranging from 3.6 milligrams per kilogram (mg/kg) (soil boring SSI-17) to 29,000 mg/kg (soil boring SSI-3).

Summary

The above information will be used in planning and adjusting the proposed limits of the low-permeability cap as illustrated in the October 21, 2015 RFI Summary Report.

Please contact me at (412) 241-4500 if you have questions or comments.

Sincerely,

WOODARD & CURRAN

Patrick F. O'Hara, P.E.
Senior Vice President

Jill D. Tribley, P.G.
Project Geologist

JDT/jlm
Attachments

cc: Mr. Lawrence Matson – Delaware Department of Natural Resources and Environmental Control (one copy)
Mr. Rob Savarese – Chemtrade Solutions LLC (electronic mail)
Mr. David Burroughs – Chemtrade Solutions LLC (electronic mail)
Dean Calland, Esq. – Babst Calland (electronic mail)
Mr. Luis Pizzaro – U.S. Environmental Protection Agency (electronic mail)
Adam Meek, Esq. – Brownfield Management Associates, LLC (electronic mail)
Michael Meloy, Esq. – Manko Gold (electronic mail)
Mr. Matt Brill, P.G. – AECOM (electronic mail)
Mr. Jeremy Glisson – Braskem (electronic mail)
Mr. Gary Rabik, P.E. – Braskem (electronic mail)
Mr. Gary Walters, CHMM – ERM (electronic mail)
Mr. David White – Brownfield Management Associates, LLC (electronic mail)
Mr. Keith Delaney – D2M Management, LLC (electronic mail)
Mr. Kevin McGowan – McGowan Advisors (electronic mail)

PN: 03360.25

TABLES

TABLE 1
GROUNDWATER ELEVATIONS[a]
DELAWARE VALLEY WORKS
CLAYMONT, DELAWARE

Boring I.D.	Surface Elevation (ft. MSL)[b]	Depth to Water Table (ft. bgs)[c]	Groundwater Elevation (ft. MSL)
SSI-1	10.52	4.00	6.52
SSI-2	11.40	4.50	6.90
SSI-3	11.87	4.50	7.37
SSI-4	12.55	5.00	7.55
SSI-5	11.65	5.00	6.65
SSI-6	11.11	5.00	6.11
SSI-7	12.96	7.00	5.96
SSI-8	14.14	4.00	10.14
SSI-9	11.40	5.00	6.40
SSI-10	12.81	4.50	8.31
SSI-11	12.87	5.00	7.87
SSI-12	10.78	6.00	4.78
SSI-13	9.65	6.50	3.15
SSI-14	8.42	4.50	3.92
SSI-15	11.02	6.00	5.02
SSI-16	11.38	5.00	6.38
SSI-17	13.83	8.00	5.83
SSI-18	10.60	5.00	5.60
SSI-19	9.48	7.00	2.48
SSI-20	9.88	7.00	2.88

Notes:

[a] Groundwater levels were measured from direct-push soil borings, and not monitoring wells.

[b] "ft. MSL" is feet above mean sea level.

[c] "ft. bgs" is feet below ground surface.

TABLE 2
SOIL SAMPLE ANALYTICAL RESULTS
DELAWARE VALLEY WORKS
CLAYMONT, DELAWARE

Boring I.D.	Sample Depth (ft. bgs)[a]	Arsenic Result (mg/kg)[b]
SSI-1	0-2	46
SSI-1	2-3	41
SSI-2	0-2	55
SSI-2	2-3.5	9.3
SSI-3	0-2	1,700
SSI-3	2-3.5	29,000
SSI-4	0-2	35
SSI-4	2-4	18
SSI-5	0-2	16 / 9.3
SSI-5	2-4	63
SSI-6	0-2	40
SSI-6	2-4	70
SSI-7	0-2	12
SSI-7	2-4	68
SSI-7	4-6	6.5 B[c]
SSI-8	0-1	18 B
SSI-8	1-2	9.7 B
SSI-8	2-3	12 B
SSI-9	0-1.5	91 B
SSI-9	1.5-2.5	15 B
SSI-9	2.5-4	170 B
SSI-10	0-1.5	6.4 B
SSI-10	1.5-2.5	8.4 B
SSI-10	2.5-3.5	3.7 B
SSI-11	0-2	36
SSI-11	3-4	7.3
SSI-12	0-2	230
SSI-12	2-3.5	320
SSI-12	3.5-5	130
SSI-13	0-2	41
SSI-13	2-4	1,100 B
SSI-13	4-5.5	530 B

TABLE 2
SOIL SAMPLE ANALYTICAL RESULTS
DELAWARE VALLEY WORKS
CLAYMONT, DELAWARE

Boring I.D.	Sample Depth (ft. bgs)[a]	Arsenic Result (mg/kg)[b]
SSI-14	0-1.5	51 B
SSI-14	1.5-3	180 B
SSI-14	3-4	96 B
SSI-15	0-2	21 B
SSI-15	2-3	73 B
SSI-15	3-5	130 B / 45 B
SSI-16	0-1.5	22 B
SSI-16	1.5-2.5	35 B
SSI-16	2.5-4	40 B
SSI-17	0-2	84
SSI-17	2.5-4.5	8.3
SSI-17	5-7	3.6
SSI-18	0-1.5	100
SSI-18	1.5-3	490
SSI-18	3-4	270
SSI-19	0-2	710 B / 250 B
SSI-19	2-4	690 B
SSI-19	4-6	280 B
SSI-20	0-2	440 B
SSI-20	2-4	820 B
SSI-20	4-6	1,100 B

Notes:

[a] "ft. bgs" indicates feet below ground surface.

[b] "mg/kg" is milligrams per kilogram, or parts per million.

[c] "B" indicates the compound was also detected in the associated method blank.

FIGURES

22x34 SHEET
1:2.02

REFERENCE:
EARTH SCIENCE CONSULTANTS, INC., DRAWING NO. 5455415.

LEGEND

- PROPERTY BOUNDARY
- TOPOGRAPHIC CONTOURS
- RFI PHASE I SOLID WASTE MANAGEMENT UNITS
- RFI PHASE II SOLID WASTE MANAGEMENT UNITS
- RFI PHASE I AREA OF CONCERN (AOC)
- RFI PHASE II AREA OF CONCERN (AOC)
- AREA OF PRESUMPTIVE REDEVELOPMENT CAPPING REMEDY (POSSIBLY COMPLETED IN PHASES)
- AREA OF PRESUMPTIVE REDEVELOPMENT LOW PERMIABILITY CAPPING REMEDY (POSSIBLY COMPLETED IN PHASES)
- SSI-12 DIRECT PUSH SAMPLE LOCATION – DECEMBER 2015

NOTES
1. FACILITY GRID IS BASED ON DELAWARE STATE PLANE MERIDIAN, NAD 27.
2. SWMUs AND AOCs ARE ONLY SHOWN THAT ARE RELEVENT TO THE SOUTH PLANT.

SOLID WASTE MANAGEMENT UNITS (RFI PHASE I)
1. FORMER NORTH PHOSPHORIC ACID POND
2. SOUTH PHOSPHORIC ACID POND
5. FORMER SPAR BUILDING STORAGE AREA
6. SOUTH TREATMENT PLANT, DRUM STORAGE
7. EFFLUENT CLARIFIER
8. EFFLUENT CLARIFIER
10. SOUTH WASTE TREATMENT STORAGE PAD
26. SOUTH WASTE TREATMENT PLANT

SOLID WASTE MANAGEMENT UNITS (RFI PHASE II)
35. FORMER HAZARDOUS WASTE STORAGE PAD
36. FORMER ALUM PLANT AREA/DEBRIS STAGING AREA

AREAS OF CONCERN (RFI PHASE I)
AOC 2 – ACID SPILL AREA
AOC 4 – CONRAIL FUEL SPILL AREA

AREAS OF CONCERN (RFI PHASE II)
AOC 14 – FORMER SULFURIC ACID STORAGE TANK AREA SUMP

SCALE
100 0 100 200 FEET

300 Penn Center Blvd., Suite 800
Pittsburgh, Pennsylvania 15235
800.883.3266 | www.woodardcurran.com

COMMITMENT & INTEGRITY DRIVE RESULTS

REV	DESCRIPTION	DATE
	DESIGNED BY: R.E. JONES CHECKED BY: P.F. O'HARA	
	DRAWN BY: D.J. MARTINO I:\3360_D17.dwg	

DIRECT PUSH SAMPLING LOCATION FALL 2015

DELAWARE VALLEY WORKS
(SOUTH PLANT)
CLAYMONT, DELAWARE

CHEMTRADE LOGISTICS LLC
PARSIPPANY, NEW JERSEY

JOB NO.:	03-360
DATE:	DECEMBER 16, 2015
SCALE:	SHOWN
SHEET:	1 OF 1

FIGURE 1

K:\cadd\projects\03-360\03360_D17.dwg, Dec 17, 2015 - 2:27pm

22x34 SHEET
1:2.02

SSI-1	0 - 2'	2 - 3'
Arsenic	46	41

SSI-2	0 - 2'	2 - 3.5'
Arsenic	55	9.3

SSI-3	0 - 2'	2 - 3.5'
Arsenic	1,700	29,000

SSI-4	0 - 2'	2 - 4'
Arsenic	35	18

SSI-5	0 - 2'	2 - 4'
Arsenic	16 / 9.3	63

SSI-6	0 - 2'	2 - 4
Arsenic	40	70

SSI-7	0 - 2'	2 - 4'	4 - 6'
Arsenic	12	68	6.5 B

SSI-8	0-1'	1 - 2'	2 - 3'
Arsenic	18 B	9.7 B	12 B

SSI-9	0 - 1.5'	1.5 - 2.5'	2.5 - 4'
Arsenic	91 B	15 B	170 B

SSI-10	0 - 1.5'	1.5 - 2.5'	2.5 - 3.5'
Arsenic	6.4 B	8.4 B	3.7 B

SSI-11	0 - 2'	3 - 4'
Arsenic	36	7.3

SSI-12	0 - 2'	2 - 3.5'	3.5 - 5'
Arsenic	230	320	130

SSI-13	0 - 2'	2 - 4'	4 - 5.5'
Arsenic	41	1,100 B	530 B

SSI-14	0 - 1.5'	1.5 - 3'	3 - 4'
Arsenic	51 B	180 B	96 B

SSI-15	0 - 2'	2 - 3'	3 - 5'
Arsenic	21 B	73 B	130 B / 45 B

SSI-16	0 - 1.5'	1.5 - 2.5'	2.5 - 4'
Arsenic	22 B	35 B	40 B

SSI-17	0 - 2'	2.5 - 4.5'	5 - 7'
Arsenic	84	8.3	3.6

SSI-18	0 - 1.5'	1.5 - 3'	3 - 4'
Arsenic	100	490	270

SSI-19	0 - 2'	2 - 4'	4 - 6'
Arsenic	710 B / 250 B	690 B	280 B

SSI-20	0 - 2'	2 - 4'	4 - 6'
Arsenic	440 B	820 B	1,100 B

UPPER SLUICEWAY

CONRAIL

LOWER SLUICEWAY

AOC 2

~COVE

AOC 14

AOC 1

CHEMTRADE PROPERTY
PARCEL ID – 0607300002

OCEANPORT INDUSTRIES

LEGEND

- PROPERTY BOUNDARY
- TOPOGRAPHIC CONTOURS
- RFI PHASE I SOLID WASTE MANAGEMENT UNITS
- RFI PHASE II SOLID WASTE MANAGEMENT UNITS
- RFI PHASE I AREA OF CONCERN (AOC)
- RFI PHASE II AREA OF CONCERN (AOC)
- AREA OF PRESUMPTIVE REDEVELOPMENT CAPPING REMEDY (POSSIBLY COMPLETED IN PHASES)
- AREA OF PRESUMPTIVE REDEVELOPMENT LOW PERMIABILITY CAPPING REMEDY (POSSIBLY COMPLETED IN PHASES)
- SSI-12 DIRECT PUSH SAMPLE LOCATION – DECEMBER 2015

SAMPLE I.D.	FEET BELOW GROUND SURFACE
ARSENIC (mg/kg)	RESULT

NOTES:
1. FACILITY GRID IS BASED ON DELAWARE STATE PLANE MERIDIAN, NAD 27.
2. SWMUs AND AOCs ARE SHOWN THAT ARE RELEVENT TO THE SOUTH PLANT.

SOLID WASTE MANAGEMENT UNITS (RFI PHASE I)
1. FORMER NORTH PHOSPHORIC ACID POND
2. SOUTH PHOSPHORIC ACID POND
5. FORMER SPAR BUILDING STORAGE AREA
6. SOUTH TREATMENT PLANT, DRUM STORAGE
7. EFFLUENT CLARIFIER
8. EFFLUENT CLARIFIER
10. SOUTH WASTE TREATMENT STORAGE PAD
26. SOUTH WASTE TREATMENT PLANT

SOLID WASTE MANAGEMENT UNITS (RFI PHASE II)
35. FORMER HAZARDOUS WASTE STORAGE PAD
36. FORMER ALUM PLANT AREA/DEBRIS STAGING AREA

AREAS OF CONCERN (RFI PHASE I)
AOC 2 – ACID SPILL AREA
AOC 4 – CONRAIL FUEL SPILL AREA

AREAS OF CONCERN (RFI PHASE II)
AOC 14 – FORMER SULFURIC ACID STORAGE TANK AREA SUMP

SCALE
60 0 60 120 FEET

REFERENCE:
EARTH SCIENCE CONSULTANTS, INC., DRAWING NO. 5455415.

300 Penn Center Blvd., Suite 800
Pittsburgh, Pennsylvania 15235
800.883.3266 | www.woodardcurran.com
COMMITMENT & INTEGRITY DRIVE RESULTS

REV	DESCRIPTION	DATE
	DESIGNED BY: R.E. JONES; CHECKED BY: P.F. O'HARA	
	DRAWN BY: D.J. MARTINO (03360_D18.dwg)	

DIRECT PUSH SAMPLING ARSENIC RESULTS DECEMBER 2015

DELAWARE VALLEY WORKS (SOUTH PLANT) CLAYMONT, DELAWARE

CHEMTRADE LOGISTICS LLC PARSIPPANY, NEW JERSEY

JOB NO.: 03-360
DATE: DECEMBER 16, 2015
SCALE: SHOWN
SHEET: 1 OF 1

FIGURE 2

K:\cad\projects\03-360\03360_D18.dwg, Dec 17, 2015 - 2:24pm

ATTACHMENT A

CERTIFICATION STATEMENT
DATA REPORT – SUPPLEMENTAL SOIL INVESTIGATION
CHEMTRADE SOLUTIONS LLC
CLAYMONT, DELAWARE

I certify that the information contained in this report is true, accurate and complete.

As to those portions of the report for which I cannot personally verify their accuracy, I certify under penalty of law that this report and all attachments were prepared in accordance with procedures designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, or the immediate supervisor of such person or persons, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations.

Dan Dietz, Vice President

December 22, 2015
Date

ATTACHMENT B

SHEET ____ OF ____

WOODARD &CURRAN

LOG OF BORING NO. SSI - 1

Client: Chem Trade
Site Name: Delaware Valley Works
Location: Claymont, DE
Drilling Co. A-Zone Environmental
Field Geologist: Jill Tribley
Driller: Scott MacKinnon
Checked By:
Drilling Method: Geoprobe

Project No. 03360.25
Date Started: 12/9/2015
Date Completed: 12/9/2015
Depth to GW: 4'
Date/Time: 12/9/2015 / 8:45

DEPTH (FEET)	SAMPLE NO. AND TYPE	SAMPLE RECOVERY (IN.)	SPT BLOWS (6")	PROFILE	Coordinates N ____ E ____ Surface Elev. ____ DESCRIPTION	BOREHOLE PID READING (PPM)	WELL INSTALLATION DETAIL	ELEVATION (FT. MSL)
0		24"	NA		Loose, brown to black, clay, gravel, rock fragments, concrete fragments, moist. 3.5'			
5		28"			Tan to brown clay; soft; moist; wet at 4.0'			
10					Bottom of boring at 10'			
15								
20								
25								
30								
35								
40								

SOIL BORING LOG WITH WELL INSTALLATION

SHEET ____ OF ____

WOODARD &CURRAN

LOG OF BORING NO. SSI - 2

Client: Chem Trade | Project No. 03360.25
Site Name: Delaware Valley Works | Date Started: 12/9/15
Location: Claymont, DE | Date Completed: 12/9/15
Drilling Co. A-Zone Environmental | Field Geologist: Jill Tribley | Depth to GW: 4.5'
Driller: Scott MacKinnon | Checked By: | Date/Time: 12/9/15 / 9:00
Drilling Method: Geoprobe

Coordinates N _____ E _____
Surface Elev. _____

DEPTH (FEET)	SAMPLE NO. AND TYPE	SAMPLE RECOVERY (IN.)	SPT BLOWS (6")	PROFILE	DESCRIPTION	BOREHOLE PID READING (PPM)	WELL INSTALLATION DETAIL	ELEVATION (FT. MSL)
0	0'-2' 2.5'-3.5'	26"			Brown to black, clay, cinders, rock fragments, concrete fragments, loose, dry to moist. wet at 4.5'			
5					Bottom of boring at 5.0'			
10								
15								
20								
25								
30								
35								
40								

SOIL BORING LOG WITH WELL INSTALLATION

SHEET ____ OF ____

WOODARD &CURRAN

LOG OF BORING NO. SSI - 3

Client: Chem Trade
Site Name: Delaware Valley Works
Location: Claymont, DE
Project No. 03360.25
Date Started: 12/9/15
Date Completed: 12/9/15
Drilling Co. A-Zone Environmental
Field Geologist: Jill Tribley
Depth to GW: 4.5
Driller: Scott MacKinnon
Checked By:
Date/Time: 12/9/15 / 9:30
Drilling Method: Geoprobe

Coordinates N ____ E ____
Surface Elev. ____ Sandy

DEPTH (FEET)	SAMPLE NO. AND TYPE	SAMPLE RECOVERY (IN.)	SPT BLOWS (6")	PROFILE	DESCRIPTION	BOREHOLE PID READING (PPM)	WELL INSTALLATION DETAIL	ELEVATION (FT. MSL)
0	0.0' 0.2' 2.0' 3.5'	43"			Loose, brown clay, rock/concrete fragments, dry to moist Tan and light gray coloration Some cinders. wet at 4.5' 4.75" tan clay			
5					Bottom of boring at 5'			
10								
15								
20								
25								
30								
35								
40								

SOIL BORING LOG WITH WELL INSTALLATION

SHEET ____ OF ____

WOODARD &CURRAN

LOG OF BORING NO. SSI – 4

Client: Chem Trade | Project No. 03360.25
Site Name: Delaware Valley Works | Date Started: 12/9/15
Location: Claymont, DE | Date Completed: 12/9/15
Drilling Co. A-Zone Environmental | Field Geologist: Jill Tribley | Depth to GW: 5'
Driller: Scott MacMahon | Checked By: | Date/Time: 12/9/15 9:55
Drilling Method: Geoprobe

Coordinates N _____ E _____
Surface Elev. _____

DEPTH (FEET)	SAMPLE NO. AND TYPE	SAMPLE RECOVERY (IN.)	SPT BLOWS (6")	PROFILE	DESCRIPTION	BOREHOLE PID READING (PPM)	WELL INSTALLATION DETAIL	ELEVATION (FT. MSL)
0	0'-2'	42"			0-1.5 Loose tan-white sand/cinders, rock fragments; dry			
	2'-4'				1.5-6 Soft, tan/gray/black clay, some rock or wood fragments; moist			
5		28"			wet at 5'; odor (organic)			
					6' Tan and gray mottled clay; wet			
10					Bottom of boring at 10'			
15								
20								
25								
30								
35								
40								

SOIL BORING LOG WITH WELL INSTALLATION

SHEET ____ OF ____

WOODARD &CURRAN

LOG OF BORING NO. SSI – 5

Client: Chem Trade
Site Name: Delaware Valley Works
Location: Claymont, DE
Field Geologist: Jill Tribley
Checked By:

Project No. 03360.25
Date Started: 12/9/15
Date Completed: 12/9/15
Depth to GW: 5
Date/Time: 12/9/15 / 8:00 11:45

Drilling Co. A-Zone Environmental
Driller: Scott MacKinnon
Drilling Method: Geoprobe

DEPTH (FEET)	SAMPLE NO. AND TYPE	SAMPLE RECOVERY (IN.)	SPT BLOWS (6")	PROFILE	DESCRIPTION	BOREHOLE PID READING (PPM)	WELL INSTALLATION DETAIL	ELEVATION (FT. MSL)
0	6'-2'	30"			Coordinates N ____ E ____ Surface Elev. ____ Tan and brown clayey sand, cinders, rock fragments; loose, dry to moist.			
	2'-4'				wet at 5'			
5		24"			Red paint staining @ 5' 5' Soft tan and gray clay, wet			
10					Bottom of boring at 10'			
15								
20								
25								
30								
35								
40								

SOIL BORING LOG WITH WELL INSTALLATION

SHEET ___ OF ___

WOODARD &CURRAN

LOG OF BORING NO. SSI-6

Client: Chem Trade
Site Name: Delaware Valley Works
Location: Claymont, DE
Drilling Co. A-Zone Environmental
Field Geologist: Jill Tribley
Driller: Scott MacKinnon
Checked By:
Drilling Method: Geoprobe

Project No. 03360.25
Date Started: 12/9/15
Date Completed: 12/9/15
Depth to GW: 5'
Date/Time: 12/9/15 / 12:25

DEPTH (FEET)	SAMPLE NO. AND TYPE	SAMPLE RECOVERY (IN.)	SPT BLOWS (6")	PROFILE	Coordinates N ___ E ___ Surface Elev. ___ DESCRIPTION	BOREHOLE PID READING (PPM)	WELL INSTALLATION DETAIL	ELEVATION (FT. MSL)
0		41"			Medium stiff brown to tan clay with black cinders and rock fragments; dry to moist. gray + brown mottling present throughout. wet at 5'			
5		22"						
10					Bottom of boring at 10'			
15								
20								
25								
30								
35								
40								

SOIL BORING LOG WITH WELL INSTALLATION

SHEET ___ OF ___

WOODARD &CURRAN

LOG OF BORING NO. SSI - 7

Client: Chem Trade
Site Name: Delaware Valley Works
Location: Claymont, DE
Drilling Co.: A-Zone Environmental
Field Geologist: Jill Tribley
Driller: Scott MacGunnigle
Checked By:
Drilling Method: Geoprobe

Project No.: 03360.25
Date Started: 12/9/15
Date Completed: 12/9/15
Depth to GW: 7'
Date/Time: 12/9/15 / 13:00

Coordinates N ___ E ___
Surface Elev. ___

DEPTH (FEET)	SAMPLE NO. AND TYPE	SAMPLE RECOVERY (IN.)	SPT BLOWS (6")	PROFILE	DESCRIPTION	BOREHOLE PID READING (PPM)	WELL INSTALLATION DETAIL	ELEVATION (FT. MSL)
0	0-2	32"			Loose, brown/tan/gray clay, rock/concrete fragments; dry to moist. 2'			
	2-4				Tan w/ brown/gray mottling, soft clay; moist			
5	4-6	95"			7'			
					Soft, black clay, wet			
10					Bottom of boring at 10'			
15								
20								
25								
30								
35								
40								

SOIL BORING LOG WITH WELL INSTALLATION

SHEET ____ OF ____

WOODARD &CURRAN

LOG OF BORING NO. SSI – 8

Client: Chem Trade
Site Name: Delaware Valley Works
Location: Claymont, DE
Field Geologist: Jill Tribley
Checked By:

Project No. 03360.25
Date Started: 12/9/15
Date Completed: 12/9/15
Depth to GW: 4'
Date/Time: 12/9/15 / 14:00

Drilling Co. Arzone Environmental
Driller: Scott MacKinnon
Drilling Method: Geoprobe

Coordinates N _____ E _____
Surface Elev. _____

DEPTH (FEET)	SAMPLE NO. AND TYPE	SAMPLE RECOVERY (IN.)	SPT BLOWS (6")	PROFILE	DESCRIPTION	BOREHOLE PID READING (PPM)	WELL INSTALLATION DETAIL	ELEVATION (FT. MSL)
0		24"			Brown/gray sand, ~~Soft~~ clay, rock/ concrete/brick fragments; loose, dry to moist.			
					wet at 4'			
5					Tan Soft clay, wet			
					Bottom of boring at 5'			
10								
15								
20								
25								
30								
35								
40								

SOIL BORING LOG WITH WELL INSTALLATION

SHEET ____ OF ____

WOODARD &CURRAN

LOG OF BORING NO. SSI - 9

Client: Chem Trade
Site Name: Delaware Valley Works
Location: Claymont, DE
Drilling Co.: A-Zone Environmental
Field Geologist: Jill Tribley
Driller: Scott MacCannon
Checked By:
Drilling Method: Geoprobe

Project No.: 03360.25
Date Started: 12/9/15
Date Completed: 12/9/15
Depth to GW: 5'
Date/Time: 12/9/15 / 14:20

Coordinates N _____ E _____
Surface Elev. _____

DEPTH (FEET)	SAMPLE NO. AND TYPE	SAMPLE RECOVERY (IN.)	SPT BLOWS (6")	PROFILE	DESCRIPTION	BOREHOLE PID READING (PPM)	WELL INSTALLATION DETAIL	ELEVATION (FT. MSL)
0	0-1.5 1.5-2.5 2.5-4	30"			Brown/tan/black sand, clay, rock/concrete fragments, loose, dry to moist.			
5		33"			5' Tan/gray soft clay, mottled, wet			
10					Bottom of boring at 10'			
15								
20								
25								
30								
35								
40								

SOIL BORING LOG WITH WELL INSTALLATION

SHEET ___ OF ___

WOODARD &CURRAN

LOG OF BORING NO. SSI – 10

Client: Chem Trade
Site Name: Delaware Valley Works
Location: Claymont, DE
Drilling Co. A-Zone Environmental
Field Geologist: Jill Tribley
Driller: Scott MacKinnon
Checked By:
Drilling Method: Geoprobe

Project No. 03360.25
Date Started: 12/9/15
Date Completed: 12/9/15
Depth to GW: 4.5
Date/Time: 12/9/15 / 14:50

DEPTH (FEET)	SAMPLE NO. AND TYPE	SAMPLE RECOVERY (IN.)	SPT BLOWS (6")	PROFILE	Coordinates N ___ E ___ Surface Elev. ___ DESCRIPTION	BOREHOLE PID READING (PPM)	WELL INSTALLATION DETAIL	ELEVATION (FT. MSL)
0	0-1.5 1.5-2.5 2.5-3.5	22"			Light tan/gray sand, clay, rock/ concrete fragments; loose; dry to moist. wet at 4.5			
5					Bottom of boring at 5'			
10								
15								
20								
25								
30								
35								
40								

SOIL BORING LOG WITH WELL INSTALLATION

SHEET ____ OF ____

WOODARD &CURRAN

LOG OF BORING NO. SSI - 11

Client: Chem Trade
Site Name: Delaware Valley Works
Location: Claymont, DE
Drilling Co.: A-Zone Environmental
Field Geologist: Jill Tribley
Driller: Scott MacKinnon
Checked By:
Drilling Method: Geoprobe

Project No.: 03360.25
Date Started: 12/10/15
Date Completed: 12/10/15
Depth to GW: 5'
Date/Time: 12/10/15 / 8:00

Coordinates N ____ E ____
Surface Elev. ____

DEPTH (FEET)	SAMPLE NO. AND TYPE	SAMPLE RECOVERY (IN.)	SPT BLOWS (6")	PROFILE	DESCRIPTION	BOREHOLE PID READING (PPM)	WELL INSTALLATION DETAIL	ELEVATION (FT. MSL)
0								
	U-2	41"		Loose	Brown sand and clay with rock/concrete fragments; dry to moist			
	3-4				concrete slab at 2'			
5		24"			wet at 5' 5'			
					Soft tan clay, wet			
10					Bottom of boring at 10'			
15								
20								
25								
30								
35								
40								

SOIL BORING LOG WITH WELL INSTALLATION

SHEET ____ OF ____

WOODARD &CURRAN

LOG OF BORING NO. SSI-12

Client: Chem Trade | Project No. 03360.25
Site Name: Delaware Valley Works | Date Started: 12/10/15
Location: Claymont, DE | Date Completed: 12/10/15
Drilling Co. A-Zone Environmental | Field Geologist: Jill Tribley | Depth to GW: 6'
Driller: Scott MacLennon | Checked By: | Date/Time: 12/10/15 / 8:55
Drilling Method: Geoprobe

Coordinates N ____ E ____
Surface Elev. ____

DEPTH (FEET)	SAMPLE NO. AND TYPE	SAMPLE RECOVERY (IN.)	SPT BLOWS (6")	PROFILE	DESCRIPTION	BOREHOLE PID READING (PPM)	WELL INSTALLATION DETAIL	ELEVATION (FT. MSL)
0	0'-2'	46"			Loose to med. dense sand, clay, cinders, rock/brick/concrete fragments; dry to moist. 2'			
	2'-3.5'				Medium-stiff; black to brown to tan to gray clay; mottled, dry to moist. Scattered areas of cinders			
5	3.5'-5'	41"			wet at 6'.			
10					Bottom of boring at 10'			
15								
20								
25								
30								
35								
40								

SOIL BORING LOG WITH WELL INSTALLATION

SHEET ____ OF ____

WOODARD &CURRAN

LOG OF BORING NO. SSI - 13

Client: Chem Trade | Project No. 03360.25
Site Name: Delaware Valley Works | Date Started: 12/10/15
Location: Claymont, DE | Date Completed: 12/10/15
Drilling Co. A-Zone Environmental | Field Geologist: Jill Tribley | Depth to GW: 6.5'
Driller: Scott MacKinnon | Checked By: | Date/Time: 12/10/15 / 9:30
Drilling Method: Geoprobe

Coordinates N ____ E ____
Surface Elev. ____

DEPTH (FEET)	SAMPLE NO. AND TYPE	SAMPLE RECOVERY (IN.)	SPT BLOWS (6")	PROFILE	DESCRIPTION	BOREHOLE PID READING (PPM)	WELL INSTALLATION DETAIL	ELEVATION (FT. MSL)
0	~~0'-5'~~ JK	37"	0'-2'		0-6" brown sandy clayey soil, dry 6"-2' crushed concrete (2')			
	~~2.5'-3'~~		2'-4'		med-stiff to soft tan clay w/ cinders, rock/brick fragments, minor red paint staining at 2.5'; dry (4.0')			
	~~3'-4.5'~~		4'-5.5'					
5		29"			med stiff to soft brown/tan/black clay, moist wet at 6.5'			
					odor at bottom of boring; black coloration			
10					Bottom of boring at 10'			
15								
20								
25								
30								
35								
40								

SOIL BORING LOG WITH WELL INSTALLATION

SHEET ___ OF ___

WOODARD &CURRAN

LOG OF BORING NO. SSI-14

Client: Chem Trade
Site Name: Delaware Valley Works
Location: Claymont, DE
Project No. 03360.25
Date Started: 12/10/15
Date Completed: 12/10/15
Drilling Co. A-Zone Environmental
Field Geologist: Jill Tribley
Depth to GW: 4.5'
Driller: Scott MacKinnon
Checked By:
Date/Time: 12/10/15 / 11:00
Drilling Method: Geoprobe

DEPTH (FEET)	SAMPLE NO. AND TYPE	SAMPLE RECOVERY (IN.)	SPT BLOWS (6")	PROFILE	Coordinates N ___ E ___ Surface Elev. ___ DESCRIPTION	BOREHOLE PID READING (PPM)	WELL INSTALLATION DETAIL	ELEVATION (FT. MSL)
0	0-1.5'	31"			Loose, tan/brown clayey sand, rock fragments, black cinders. Dark red staining 1.5'-4'; dry to moist.			
	1.5-3'				4.5			
5	3-4'				Dark-red stained sandy clay, ↑ wet soft			
		35"						
10					Bottom of boring at 10'			
15								
20								
25								
30								
35								
40								

SOIL BORING LOG WITH WELL INSTALLATION

SHEET ___ OF ___

WOODARD &CURRAN

LOG OF BORING NO. SSI – 15

Client: Chem Trade | Project No. 03360.25
Site Name: Delaware Valley Works | Date Started: 12/9/15
Location: Claymont, DE | Date Completed: 12/9/15
Drilling Co. A-Zone Environmental | Field Geologist: Jill Tribley | Depth to GW: ___
Driller: Scott MacKinnon | Checked By: JDT | Date/Time: 12/9/15/15:10
Drilling Method: Geoprobe

DEPTH (FEET)	SAMPLE NO. AND TYPE	SAMPLE RECOVERY (IN.)	SPT BLOWS (6")	PROFILE	Coordinates N ___ E ___ Surface Elev. ___ DESCRIPTION	BOREHOLE PID READING (PPM)	WELL INSTALLATION DETAIL	ELEVATION (FT. MSL)
0	0-2	30"			Loose, brown/tan/black sand, clay, rock/concrete/brick fragments; dry to moist			
	2-3							
5	3-5	50"			Tan/gray/black soft clay; moist to wet wet at 6'			
10					Bottom of boring at 10'			
15								
20								
25								
30								
35								
40								

SOIL BORING LOG WITH WELL INSTALLATION

SHEET ___ OF ___

WOODARD &CURRAN

LOG OF BORING NO. SSI - 1b

Client: Chem Trade
Project No. 03360.25
Site Name: Delaware Valley Works
Date Started: 12/9/15
Location: Claymont, DE
Date Completed: 12/9/15
Drilling Co. A-Zone Environmental
Field Geologist: Jill Tribley
Depth to GW: 5'
Driller: Scott MacKinnon
Checked By:
Date/Time: 12/9/15 / 15:30
Drilling Method: Geoprobe

DEPTH (FEET)	SAMPLE NO. AND TYPE	SAMPLE RECOVERY (IN.)	SPT BLOWS (6")	PROFILE	Coordinates N ___ E ___ Surface Elev. ___ DESCRIPTION	BOREHOLE PID READING (PPM)	WELL INSTALLATION DETAIL	ELEVATION (FT. MSL)
0	0-1.5	34"			Brown/black loose sand, rock/concrete/brick fragments, cinders, clay; moist			
	1.5-2.5				red paint staining at 2-5'			
	2.5-4				3.0			
5		36"			Soft brown/tan/gray clay; mottled; moist to wet wet at 5'			
10					Bottom of boring at 10'			
15								
20								
25								
30								
35								
40								

SOIL BORING LOG WITH WELL INSTALLATION

Sheet ____ of ____

LOG OF BORING NO. SSI - 17

Client: Chem Trade
Site Name: Delaware Valley Works
Location: Claymont, DE
Project No. 03360.25
Date Started: 12/10/15
Date Completed: 12/10/15
Drilling Co. A-Zone Environmental
Field Geologist: Jill Tribley
Depth to GW: 7'
Driller: Scott MacKinnon
Checked By: _____
Date/Time: 12/10/15 / 8:30
Drilling Method: Geoprobe

Coordinates N _____ E _____
Surface Elev. _____

DEPTH (FEET)	SAMPLE NO. AND TYPE	SAMPLE RECOVERY (IN.)	SPT BLOWS (6")	PROFILE	DESCRIPTION	BOREHOLE PID READING (PPM)	WELL INSTALLATION DETAIL	ELEVATION (FT. MSL)
0	0'-2'	51"			Loose, brown to black clayey sand, rock/concrete/brick fragments, dry to moist cinders 3.5'			
	2.5'-4.5'				Medium-dense, tan and gray clay, mottled, moist.			
5	5'-7'	38"			wet at 8'			
10					Bottom of boring at 10'			
15								
20								
25								
30								
35								
40								

SOIL BORING LOG WITH WELL INSTALLATION

SHEET ____ OF ____

WOODARD &CURRAN

LOG OF BORING NO. SSI – 18

Client: Chem Trade
Site Name: Delaware Valley Works
Location: Claymont, DE
Drilling Co.: A-Zone Environmental
Field Geologist: Jill Tribley
Driller: Scott MacKinnon
Checked By:
Drilling Method: Geoprobe

Project No.: 03360.25
Date Started: 12/10/15
Date Completed: 12/16/15
Depth to GW: 5'
Date/Time: 12/10/15 / 9:20

Coordinates N _____ E _____
Surface Elev. _____

DEPTH (FEET)	SAMPLE NO. AND TYPE	SAMPLE RECOVERY (IN.)	SPT BLOWS (6")	PROFILE	DESCRIPTION	BOREHOLE PID READING (PPM)	WELL INSTALLATION DETAIL	ELEVATION (FT. MSL)
0	~~0-1~~ 0.1-1.5'	29"			Loose clayey sand, cinders, rock fragments; red paint staining 2.0'-2.5'; dry to moist 2.5'			
	1.5'-3'				Soft to med stiff tan and gray clay, some sand, mottled, moist			
5	3'-4'				wet at 5'			
		29"			wood fragments w/ odor			
10					odor			
					Bottom of boring at 10' bgs			
15								
20								
25								
30								
35								
40								

SOIL BORING LOG WITH WELL INSTALLATION

SHEET ___ OF ___

WOODARD &CURRAN

LOG OF BORING NO. SSI – 19

Client: Chem Trade | Project No. 03360.25
Site Name: Delaware Valley Works | Date Started: 12/10/15
Location: Claymont, DE | Date Completed: 12/10/15
Drilling Co. A-Zone Environmental | Field Geologist: Jill Tribley | Depth to GW: 7
Driller: Scott Mackinnon | Checked By: | Date/Time: 12/10/15 / 10:30
Drilling Method: Geoprobe

Coordinates N ____ E ____
Surface Elev. ____

DEPTH (FEET)	SAMPLE NO. AND TYPE	SAMPLE RECOVERY (IN.)	SPT BLOWS (6")	PROFILE	DESCRIPTION	BOREHOLE PID READING (PPM)	WELL INSTALLATION DETAIL	ELEVATION (FT. MSL)
0	0'-2'	19"			Soft to med-stiff, brown to black clay w/ sand, rock/concrete/wood fragments; dry to moist 3.5'			
	2'-4'							
5	4'-6'	31"			Soft to med-stiff tan to gray sandy clay, some rock fragments, mottled, moist ↑ and concrete 7			
					wet at 7' Soft black to dark red-brown sandy clay, wet; strong organic odor			
10					Bottom of boring at 10'			
15								
20								
25								
30								
35								
40								

SOIL BORING LOG WITH WELL INSTALLATION

SHEET ____ OF ____

WOODARD &CURRAN

LOG OF BORING NO. SSI-20

Client: Chem Trade | Project No. 03360.25
Site Name: Delaware Valley Works | Date Started: 12/10/15
Location: Claymont, DE | Date Completed: 12/10/15
Drilling Co.: A-Zone Environmental | Field Geologist: Jill Tribley | Depth to GW: 7'
Driller: Scott MacKinnon | Checked By: | Date/Time: 12/10/15 10:45
Drilling Method: Geoprobe

Coordinates N ____ E ____
Surface Elev. ____

DEPTH (FEET)	SAMPLE NO. AND TYPE	SAMPLE RECOVERY (IN.)	SPT BLOWS (6")	PROFILE	DESCRIPTION	BOREHOLE PID READING (PPM)	WELL INSTALLATION DETAIL	ELEVATION (FT. MSL)
0	0-2	22"			Med-stiff to soft, tan/brown/black sandy clay w/ rock/brick/concrete fragments; mottled, dry to moist			
	2-4							
5	4-6	16"			7'			
					Soft black to dark red-brown sandy clay; strong organic odor, wet w/some rock fragments			
10					Bottom of boring at 10'			
15								
20								
25								
30								
35								
40								

SOIL BORING LOG WITH WELL INSTALLATION

WOODARD &CURRAN

SOIL SAMPLE
FIELD COLLECTION REPORT

Project Name	Delaware Valley Works	Project No.	03360.25
Date Collected	12 / 9/ 2015	Time Collected	8:45, 8:50
Collected By	Jill Tribley Woodard & Curran		

SAMPLE(S) LOCATION SKETCH (use reverse if necessary)

Refer to map "Proposed Direct-Push Sampling Locations, Fall 2015"

Sample I.D. No.	Depth of Sample	Soil Description (Color, Composition, Staining, Odor, Field Measurements[1])
SSI-1	0'-2'	Brown loose clay, cinders, rock fragments; dry
	2'-3'	Black clay, cinders, rock fragments; moist

Sampling Method: Geoprobe with macrocore samplers

Composite Sample? Y ☐ N ☒ Composite Sample I.D. No. NA

Describe Compositing: NA

SAMPLE TYPES COLLECTED

Type[2]	Volume	Per Sample?		Per Composite?	
Arsenic	4-oz. jar	Y ☒	N ☐	Y ☐	N ☐
		Y ☐	N ☐	Y ☐	N ☐
		Y ☐	N ☐	Y ☐	N ☐
		Y ☐	N ☐	Y ☐	N ☐

Number of Containers: 2

Date Received by Lab: 12 /10/ 2015 Laboratory: Test America - Pittsburgh

Weather Conditions: Sunny, 40°

Remarks:

1. Organic vapor analysis, pocket penetrometer, etc.
2. Metals, VOA, organics, etc.

WOODARD &CURRAN

SOIL SAMPLE
FIELD COLLECTION REPORT

Project Name	Delaware Valley Works	Project No.	03360.25
Date Collected	12 / 9 / 2015	Time Collected	9:05; 9:10
Collected By	Jill Tribley Woodard & Curran		

SAMPLE(S) LOCATION SKETCH (use reverse if necessary)

Refer to map "Proposed Direct-Push Sampling Locations, Fall 2015

Sample I.D. No.	Depth of Sample	Soil Description (Color, Composition, Staining, Odor, Field Measurements[1])
SS1-2	0'-2'	Loose, brown to black clay, cinders, rock fragments, concrete fragments; dry to moist
	2'-3.5'	Same as above; increased soft clay content

Sampling Method: Geoprobe with macrocore samplers

Composite Sample? Y ☐ N ☒ Composite Sample I.D. No.: NA

Describe Compositing: NA

SAMPLE TYPES COLLECTED

Type[2]	Volume	Per Sample?		Per Composite?	
Arsenic	4-oz. jar	Y ☒	N ☐	Y ☐	N ☐
		Y ☐	N ☐	Y ☐	N ☐
		Y ☐	N ☐	Y ☐	N ☐
		Y ☐	N ☐	Y ☐	N ☐

Number of Containers: 4

Date Received by Lab: 12 / 10 / 2015 Laboratory: Test America - Pittsburgh

Weather Conditions: Sunny, 40s

Remarks: MS/MSD collected at 0'-2' Sample

1. Organic vapor analysis, pocket penetrometer, etc.
2. Metals, VOA, organics, etc.

f17/corp

WOODARD &CURRAN

SOIL SAMPLE
FIELD COLLECTION REPORT

Project Name	Delaware Valley Works	Project No.	03360.25
Date Collected	12 / 9 / 2015	Time Collected	~~12~~ 9:35; 9:40
Collected By	Jill Tribley Woodard & Curran		

SAMPLE(S) LOCATION SKETCH (use reverse if necessary)

Refer to map "Proposed Direct-Push Sampling Locations, Fall 2015"

Sample I.D. No.	Depth of Sample	Soil Description (Color, Composition, Staining, Odor, Field Measurements[1])
SSI-3	0'-2'	Loose, brown/lt gray clay + sand w/ rock/concrete fragments; dry to moist
	2'-3.5'	Loose, tan/black clayey sand; few rock fragments; moist

Sampling Method: Geoprobe with macrocore samplers

Composite Sample? Y ☐ N ☒ Composite Sample I.D. No. NA

Describe Compositing: NA

SAMPLE TYPES COLLECTED

Type[2]	Volume	Per Sample?		Per Composite?	
Arsenic	4-oz. jar	Y ☒	N ☐	Y ☐	N ☐
		Y ☐	N ☐	Y ☐	N ☐
		Y ☐	N ☐	Y ☐	N ☐
		Y ☐	N ☐	Y ☐	N ☐

Number of Containers: 2

Date Received by Lab: 12 / 10 / 2015 Laboratory: Test America - Pittsburgh

Weather Conditions: 40s, Sunny

Remarks:

1. Organic vapor analysis, pocket penetrometer, etc.
2. Metals, VOA, organics, etc.

WOODARD &CURRAN

SOIL SAMPLE
FIELD COLLECTION REPORT

Project Name	Delaware Valley Works	Project No.	03360.25
Date Collected	12 / 9 / 2015	Time Collected	10:00; 10:05
Collected By	Jill Tribley Woodard & Curran		

SAMPLE(S) LOCATION SKETCH (use reverse if necessary)

Refer to map "Proposed Direct-Push Sampling Locations, Fall 2015"

Sample I.D. No.	Depth of Sample	Soil Description (Color, Composition, Staining, Odor, Field Measurements[1])
SSI-4	0'-2'	loose, tan and white sand, cinders, rock fragments; dry
	2'-4'	Soft brown and tan clay; moist

Sampling Method: Geoprobe with macrocore samplers

Composite Sample? Y ☐ N ☒ Composite Sample I.D. No. NA

Describe Compositing: NA

SAMPLE TYPES COLLECTED

Type[2]	Volume	Per Sample?		Per Composite?	
Arsenic	4-oz. jar	Y ☒	N ☐	Y ☐	N ☐
		Y ☐	N ☐	Y ☐	N ☐
		Y ☐	N ☐	Y ☐	N ☐
		Y ☐	N ☐	Y ☐	N ☐

Number of Containers: 2

Date Received by Lab: 12 / 9 / 2015 Laboratory: Test America - Pittsburgh

Weather Conditions: Sunny, 40s

Remarks:

1. Organic vapor analysis, pocket penetrometer, etc.
2. Metals, VOA, organics, etc.

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WOODARD &CURRAN

SOIL SAMPLE
FIELD COLLECTION REPORT

Project Name	Delaware Valley Works	Project No.	03360.25
Date Collected	12 / 9 / 2015	Time Collected	11:45; 11:50
Collected By	Jill Tribley Woodard & Curran		

SAMPLE(S) LOCATION SKETCH (use reverse if necessary)

Refer to map "Proposed Direct-Push Sampling Locations, Fall 2015"

Sample I.D. No.	Depth of Sample	Soil Description (Color, Composition, Staining, Odor, Field Measurements[1])
SSI-5	0'-2'	Loose Brown clay, sand, rock fragments; dry
	2'-4'	Brown clay, sand, cinders, rock fragments; dry to moist.

Sampling Method: Geoprobe with macrocore samplers

Composite Sample? Y ☐ N ☒ Composite Sample I.D. No.: NA

Describe Compositing: NA

SAMPLE TYPES COLLECTED

Type[2]	Volume	Per Sample?		Per Composite?	
Arsenic	4-oz. jar	Y ☒	N ☐	Y ☐	N ☐
		Y ☐	N ☐	Y ☐	N ☐
		Y ☐	N ☐	Y ☐	N ☐
		Y ☐	N ☐	Y ☐	N ☐

Number of Containers: 3

Date Received by Lab: 12 /10 / 2015 Laboratory: Test America - Pittsburgh

Weather Conditions: 40, Sunny

Remarks: DUP-1 collected at SSI-5 0'-2'.

1. Organic vapor analysis, pocket penetrometer, etc.
2. Metals, VOA, organics, etc.

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WOODARD &CURRAN

SOIL SAMPLE
FIELD COLLECTION REPORT

Project Name	Delaware Valley Works	Project No.	03360.25
Date Collected	12 / 9 / 2015	Time Collected	12:30, 12:35
Collected By	Jill Tribley Woodard & Curran		

SAMPLE(S) LOCATION SKETCH (use reverse if necessary)

Refer to map, "Proposed Direct-Push Sampling Locations, Fall 2015"

Sample I.D. No.	Depth of Sample	Soil Description (Color, Composition, Staining, Odor, Field Measurements[1])
SSI-6	0'-2'	Soft Tan clay with black cinders and rock fragments; dry to moist
	2'-4'	Same as above.

Sampling Method: Geoprobe with macrocore samplers

Composite Sample? Y ☐ N ☒ Composite Sample I.D. No. NA

Describe Compositing: NA

SAMPLE TYPES COLLECTED

Type[2]	Volume	Per Sample?		Per Composite?	
Arsenic	4-oz. jar	Y ☒	N ☐	Y ☐	N ☐
		Y ☐	N ☐	Y ☐	N ☐
		Y ☐	N ☐	Y ☐	N ☐
		Y ☐	N ☐	Y ☐	N ☐

Number of Containers: 2

Date Received by Lab: 12 /10 / 2015 Laboratory: Test America - Pittsburgh

Weather Conditions: 40s, cloudy

Remarks:

1. Organic vapor analysis, pocket penetrometer, etc.
2. Metals, VOA, organics, etc.

WOODARD &CURRAN

SOIL SAMPLE
FIELD COLLECTION REPORT

Project Name	Delaware Valley Works	Project No.	03360.25
Date Collected	12 / 9 / 2015	Time Collected	13:05, 13:10, 13:12
Collected By	Jill Tribley Woodard & Curran		

SAMPLE(S) LOCATION SKETCH (use reverse if necessary)

Refer to map "Proposed Direct-Push Sampling Locations, Fall 2015"

Sample I.D. No.	Depth of Sample	Soil Description (Color, Composition, Staining, Odor, Field Measurements[1])
SSI-7	0'-2'	Loose brown/tan/gray soft clay, rock fragments; dry to moist
	2'-4'	Soft tan clay with brown/gray mottling; moist
	4'-6'	same as 2'-4'

Sampling Method: Geoprobe with macrocore samplers

Composite Sample? Y ☐ N ☒ Composite Sample I.D. No.: NA

Describe Compositing: NA

SAMPLE TYPES COLLECTED

Type[2]	Volume	Per Sample?		Per Composite?	
Arsenic	4-oz. jar	Y ☒	N ☐	Y ☐	N ☐
		Y ☐	N ☐	Y ☐	N ☐
		Y ☐	N ☐	Y ☐	N ☐
		Y ☐	N ☐	Y ☐	N ☐

Number of Containers: ~~3~~ 4

Date Received by Lab: 12 / 10 / 2015 Laboratory: Test America - Pittsburgh

Weather Conditions: 40s, cloudy

Remarks:

1. Organic vapor analysis, pocket penetrometer, etc.
2. Metals, VOA, organics, etc.

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WOODARD &CURRAN

SOIL SAMPLE
FIELD COLLECTION REPORT

Project Name	Delaware Valley Works	Project No.	03360.25
Date Collected	12 / 9 / 2015	Time Collected	14:05; 14:08; 14:10
Collected By	Jill Tribley Woodard & Curran		

SAMPLE(S) LOCATION SKETCH (use reverse if necessary)

Refer to map "Proposed Direct-Push Sampling Locations, Fall 2015"

Sample I.D. No.	Depth of Sample	Soil Description (Color, Composition, Staining, Odor, Field Measurements[1])
SSI-8	0'-1'	Brown/gray sand, rock fragments; loose; dry to moist
	1'-2'	Brown/gray sand, rock/brick fragments; loose; dry to moist
	2'-3'	tan sand/clay, concrete fragments; dry to moist

Sampling Method: Geoprobe with macrocore samplers

Composite Sample? Y ☐ N ☒ Composite Sample I.D. No.: NA

Describe Compositing: NA

SAMPLE TYPES COLLECTED

Type[2]	Volume	Per Sample?		Per Composite?	
Arsenic	4-oz. jar	Y ☒	N ☐	Y ☐	N ☐
		Y ☐	N ☐	Y ☐	N ☐
		Y ☐	N ☐	Y ☐	N ☐
		Y ☐	N ☐	Y ☐	N ☐

Number of Containers: 3

Date Received by Lab: 12 /10 / 2015 Laboratory: Test America - Pittsburgh

Weather Conditions: cloudy, 40s

Remarks:

1. Organic vapor analysis, pocket penetrometer, etc.
2. Metals, VOA, organics, etc.

WOODARD &CURRAN

SOIL SAMPLE
FIELD COLLECTION REPORT

Project Name	Delaware Valley Works	Project No.	03360.25
Date Collected	12 / 9 / 2015	Time Collected	14:25; 14:28; 14:30
Collected By	Jill Tribley Woodard & Curran		

SAMPLE(S) LOCATION SKETCH (use reverse if necessary)

Refer to map "Proposed Direct-Push Sampling Locations, Fall 2015"

Sample I.D. No.	Depth of Sample	Soil Description (Color, Composition, Staining, Odor, Field Measurements[1])
SSI - 9	0'-1.5'	Brown/tan/black loose sand, rock/concrete fragments, dry to moist
	1.5'-2.5'	Same as above
	2.5'-4'	tan to black soft clay, some rock fragments, moist

Sampling Method: Geoprobe with macrocore samplers

Composite Sample? Y ☐ N ☒ Composite Sample I.D. No. NA

Describe Compositing: NA

SAMPLE TYPES COLLECTED

Type[2]	Volume	Per Sample?		Per Composite?	
Arsenic	4-oz. jar	Y ☒	N ☐	Y ☐	N ☐
		Y ☐	N ☐	Y ☐	N ☐
		Y ☐	N ☐	Y ☐	N ☐
		Y ☐	N ☐	Y ☐	N ☐

Number of Containers: 3

Date Received by Lab: 12 /10 / 2015 Laboratory: Test America - Pittsburgh

Weather Conditions: 40s, cloudy

Remarks:

1. Organic vapor analysis, pocket penetrometer, etc.
2. Metals, VOA, organics, etc.

WOODARD &CURRAN

SOIL SAMPLE
FIELD COLLECTION REPORT

Project Name	Delaware Valley Works	Project No.	03360.25
Date Collected	12 / 9 / 2015	Time Collected	14:55; 14:58; 15:00
Collected By	Jill Tribley Woodard & Curran		

SAMPLE(S) LOCATION SKETCH (use reverse if necessary)

Refer to map "Proposed Direct-Push Sampling Locations, Fall 2015"

Sample I.D. No.	Depth of Sample	Soil Description (Color, Composition, Staining, Odor, Field Measurements[1])
SSI-10	0'-1.5'	Loose, light tan/gray sand, clay, rock/concrete fragments; dry to moist
	1.5'-2.5'	Same as above
	2.5'-3.5'	Same as above – moist

Sampling Method: Geoprobe with macrocore samplers

Composite Sample? Y ☐ N ☒ Composite Sample I.D. No. NA

Describe Compositing: NA

SAMPLE TYPES COLLECTED

Type[2]	Volume	Per Sample?		Per Composite?	
Arsenic	4-oz. jar	Y ☒	N ☐	Y ☐	N ☐
		Y ☐	N ☐	Y ☐	N ☐
		Y ☐	N ☐	Y ☐	N ☐
		Y ☐	N ☐	Y ☐	N ☐

Number of Containers: 3

Date Received by Lab: 12 /10 / 2015 Laboratory: Test America - Pittsburgh

Weather Conditions: sun/clouds, 40s

Remarks:

1. Organic vapor analysis, pocket penetrometer, etc.
2. Metals, VOA, organics, etc.

WOODARD &CURRAN

SOIL SAMPLE
FIELD COLLECTION REPORT

Project Name	Delaware Valley Works	Project No.	03360.25
Date Collected	12 / 10 / 2015	Time Collected	8:00, 8:05
Collected By	Jill Tribley Woodard & Curran		

SAMPLE(S) LOCATION SKETCH (use reverse if necessary)

Refer to map "Proposed Direct-Push Sampling Locations, Fall 2015"

Sample I.D. No.	Depth of Sample	Soil Description (Color, Composition, Staining, Odor, Field Measurements[1])
SSI-11	0'-2'	Loose Brown sand and clay with rock fragments, concrete fragments, dry to moist
	3-4'	same as above moist

Sampling Method: Geoprobe with macrocore samplers

Composite Sample? Y ☐ N ☒ Composite Sample I.D. No. NA

Describe Compositing: NA

SAMPLE TYPES COLLECTED

Type[2]	Volume	Per Sample?		Per Composite?	
Arsenic	4-oz. jar	Y ☒	N ☐	Y ☐	N ☐
		Y ☐	N ☐	Y ☐	N ☐
		Y ☐	N ☐	Y ☐	N ☐
		Y ☐	N ☐	Y ☐	N ☐

Number of Containers: 2

Date Received by Lab: 12 / 11 / 2015 Laboratory: Test America - Pittsburgh

Weather Conditions: 40s, sunny

Remarks:

1. Organic vapor analysis, pocket penetrometer, etc.
2. Metals, VOA, organics, etc.

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WOODARD &CURRAN

SOIL SAMPLE
FIELD COLLECTION REPORT

Project Name	Delaware Valley Works	Project No.	03360.25
Date Collected	12 / 10 / 2015	Time Collected	9:00; 9:03; 9:05
Collected By	Jill Tribley Woodard & Curran		

SAMPLE(S) LOCATION SKETCH (use reverse if necessary)

Refer to map "Proposed Direct-Push Sampling Locations, Fall 2015"

Sample I.D. No.	Depth of Sample	Soil Description (Color, Composition, Staining, Odor, Field Measurements[1])
SSI-12	0'-2'	loose to med-dense sand, clay, cinders, rock/brick/conc. fragments, dry/m
	2'-3.5'	med-stiff, black/brown/tan/gray clay, some cinders, dry to moist
	3.5'-5'	Same as 2'-3.5'

Sampling Method: Geoprobe with macrocore samplers

Composite Sample? Y ☐ N ☒ Composite Sample I.D. No.: NA

Describe Compositing: NA

SAMPLE TYPES COLLECTED

Type[2]	Volume	Per Sample?		Per Composite?	
Arsenic	4-oz. jar	Y ☒	N ☐	Y ☐	N ☐
		Y ☐	N ☐	Y ☐	N ☐
		Y ☐	N ☐	Y ☐	N ☐
		Y ☐	N ☐	Y ☐	N ☐

Number of Containers: 5

Date Received by Lab: 12 / 11 / 2015 Laboratory: Test America - Pittsburgh

Weather Conditions: 40s, Sunny

Remarks: MS/MSD Sample collected at SSI-12 3.5'-5'

1. Organic vapor analysis, pocket penetrometer, etc.
2. Metals, VOA, organics, etc.

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WOODARD &CURRAN

SOIL SAMPLE
FIELD COLLECTION REPORT

Project Name	Delaware Valley Works	Project No.	03360.25
Date Collected	12 / 10 / 2015	Time Collected	9:55; 9:58; 10:00
Collected By	Jill Tribley Woodard & Curran		

SAMPLE(S) LOCATION SKETCH (use reverse if necessary)

Refer to map "Proposed Direct-Push Sampling Locations, Fall 2015"

Sample I.D. No.	Depth of Sample	Soil Description (Color, Composition, Staining, Odor, Field Measurements[1])
SSI-13	0'-2'	Brown clayey sandy soil; crushed concrete; dry.
	2'-4'	med-stiff to soft tan clay w/ cinders, rock/brick fragments; red pai staining 2.5', d
	4'-6'5.5' at	med-stiff to soft brown/tan/black clay, moist.

Sampling Method: Geoprobe with macrocore samplers

Composite Sample? Y ☐ N ☒ Composite Sample I.D. No.: NA

Describe Compositing: NA

SAMPLE TYPES COLLECTED

Type[2]	Volume	Per Sample?		Per Composite?	
Arsenic	4-oz. jar	Y ☒	N ☐	Y ☐	N ☐
		Y ☐	N ☐	Y ☐	N ☐
		Y ☐	N ☐	Y ☐	N ☐
		Y ☐	N ☐	Y ☐	N ☐

Number of Containers: 3

Date Received by Lab: 12 / 11 / 2015 Laboratory: Test America - Pittsburgh

Weather Conditions: 50s, Sunny

Remarks:

1. Organic vapor analysis, pocket penetrometer, etc.
2. Metals, VOA, organics, etc.

WOODARD &CURRAN

SOIL SAMPLE
FIELD COLLECTION REPORT

Project Name	Delaware Valley Works	Project No.	03360.25
Date Collected	12 /10 / 2015	Time Collected	11:15; 11:18; 11:20
Collected By	Jill Tribley Woodard & Curran		

SAMPLE(S) LOCATION SKETCH (use reverse if necessary)

Refer to Map "Proposed Direct-Push Sampling Locations, Fall 2015"

Sample I.D. No.	Depth of Sample	Soil Description (Color, Composition, Staining, Odor, Field Measurements[1])
SSI-14	0'-1.5'	Loose, tan/brown clayey sand, rock fragments, black cinders; dark red staining 1.5'-4'; dry to moist (same for all)
	1.5'-3'	
	3'-4'	

Sampling Method: Geoprobe with macrocore samplers

Composite Sample? Y ☐ N ☒ Composite Sample I.D. No.: NA

Describe Compositing: NA

SAMPLE TYPES COLLECTED

Type[2]	Volume	Per Sample?		Per Composite?	
Arsenic	4-oz. jar	Y ☒	N ☐	Y ☐	N ☐
		Y ☐	N ☐	Y ☐	N ☐
		Y ☐	N ☐	Y ☐	N ☐
		Y ☐	N ☐	Y ☐	N ☐

Number of Containers

Date Received by Lab: 12 / 11 / 2015 Laboratory: Test America - Pittsburgh

Weather Conditions

Remarks

1. Organic vapor analysis, pocket penetrometer, etc.
2. Metals, VOA, organics, etc.

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WOODARD &CURRAN

SOIL SAMPLE
FIELD COLLECTION REPORT

Project Name	Delaware Valley Works	Project No.	03360.25
Date Collected	12 / 9 / 2015	Time Collected	15:12; 15:15; 15:18
Collected By	Jill Tribley Woodard & Curran		

SAMPLE(S) LOCATION SKETCH (use reverse if necessary)

Refer to map "Proposed Direct-Push Sampling Locations, Fall 2015"

Sample I.D. No.	Depth of Sample	Soil Description (Color, Composition, Staining, Odor, Field Measurements[1])
SSI-15	0'-2'	Loose, brown/tan/black sand, clay, rock/concrete/brick frags.; dry to moist
	2'-3'	Same as above
	3'-5'	Same as above to 4'; 4'-5' Soft tan/gray/black clay; moist

Sampling Method: Geoprobe with macrocore samplers

Composite Sample? Y ☐ N ☒ Composite Sample I.D. No.: NA

Describe Compositing: NA

SAMPLE TYPES COLLECTED

Type[2]	Volume	Per Sample?		Per Composite?	
Arsenic	4-oz. jar	Y ☒	N ☐	Y ☐	N ☐
		Y ☐	N ☐	Y ☐	N ☐
		Y ☐	N ☐	Y ☐	N ☐
		Y ☐	N ☐	Y ☐	N ☐

Number of Containers: 4

Date Received by Lab: 12 / 10 / 2015 Laboratory: Test America - Pittsburgh

Weather Conditions: 40s, sun/clouds

Remarks: Dup-2 collected at SSI-15 3'-5'

1. Organic vapor analysis, pocket penetrometer, etc.
2. Metals, VOA, organics, etc.

f17/corp

WOODARD &CURRAN

SOIL SAMPLE
FIELD COLLECTION REPORT

Project Name	Delaware Valley Works	Project No.	03360.25
Date Collected	12 /9 / 2015	Time Collected	15:35; 15:38; 15:40
Collected By	Jill Tribley Woodard & Curran		

SAMPLE(S) LOCATION SKETCH (use reverse if necessary)

Refer to map "Proposed Direct-Push Sampling Locations, Fall 2015"

Sample I.D. No.	Depth of Sample	Soil Description (Color, Composition, Staining, Odor, Field Measurements[1])
SSI-16	0'-1.5'	Loose, brown/black sand, rock/concrete/brick fragments cinders, clay, moist
	1.5'-2.5'	same as above; red paint staining 2.0'-2.5'
	2.5'-4'	As above to 3'; 3'-4' Soft brown/tan/gray clay; mottled; moist

Sampling Method: Geoprobe with macrocore samplers

Composite Sample? Y ☐ N ☒ Composite Sample I.D. No. NA

Describe Compositing: NA

SAMPLE TYPES COLLECTED

Type[2]	Volume	Per Sample?		Per Composite?	
Arsenic	4-oz. jar	Y ☒	N ☐	Y ☐	N ☐
		Y ☐	N ☐	Y ☐	N ☐
		Y ☐	N ☐	Y ☐	N ☐
		Y ☐	N ☐	Y ☐	N ☐

Number of Containers: 5

Date Received by Lab: 12 /10/ 2015 Laboratory: Test America - Pittsburgh

Weather Conditions: 40s, sun/clouds

Remarks: MS/MSD collected at SSI-16 2.5'-4'

1. Organic vapor analysis, pocket penetrometer, etc.
2. Metals, VOA, organics, etc.

f17/corp

WOODARD &CURRAN

SOIL SAMPLE
FIELD COLLECTION REPORT

Project Name	Delaware Valley Works	Project No.	03360.25
Date Collected	12 / 10 / 2015	Time Collected	8:35; 8:38; 8:40
Collected By	Jill Tribley Woodard & Curran		

SAMPLE(S) LOCATION SKETCH (use reverse if necessary)

Refer to Map "Proposed Direct-Push Sampling Locations, Fall 2015"

Sample I.D. No.	Depth of Sample	Soil Description (Color, Composition, Staining, Odor, Field Measurements[1])
SSI-17	0'-2'	loose, brown to black clayey sand, rock/conc/brick frags., cinders, dry
	2.5'-4.5'	As above to 3.5'; 3.5' to 4.5' Medium-dense, tan and gray clay, mottled, moist
	5'-7'	Medium-dense, tan and gray clay, mottled, moist.

Sampling Method: Geoprobe with macrocore samplers

Composite Sample? Y ☐ N ☒ Composite Sample I.D. No.: NA

Describe Compositing: NA

SAMPLE TYPES COLLECTED

Type[2]	Volume	Per Sample?		Per Composite?	
Arsenic	4-oz. jar	Y ☒	N ☐	Y ☐	N ☐
		Y ☐	N ☐	Y ☐	N ☐
		Y ☐	N ☐	Y ☐	N ☐
		Y ☐	N ☐	Y ☐	N ☐

Number of Containers: 3

Date Received by Lab: 12 / 11 / 2015 Laboratory: Test America - Pittsburgh

Weather Conditions: 40s, sunny

Remarks:

1. Organic vapor analysis, pocket penetrometer, etc.
2. Metals, VOA, organics, etc.

WOODARD &CURRAN

SOIL SAMPLE
FIELD COLLECTION REPORT

Project Name	Delaware Valley Works	Project No.	03360.25
Date Collected	12 / 10 / 2015	Time Collected	9:25; 9:28; 9:30
Collected By	Jill Tribley Woodard & Curran		

SAMPLE(S) LOCATION SKETCH (use reverse if necessary)

Refer to map "Proposed Direct-Push Sampling Locations, Fall 2015"

Sample I.D. No.	Depth of Sample	Soil Description (Color, Composition, Staining, Odor, Field Measurements[1])
SSI-18	0'-1.5'	Loose dayey sand, cinders, rock fragments; dry to moist
	1.5'-3'	Same as above, red paint staining 2'-2.5' 2.5'-3' see below
	3'-4'	~~Same as above to 3.5'~~
		Soft to medium-stiff tan and gray clay, mottled, moist

Sampling Method: Geoprobe with macrocore samplers

Composite Sample? Y ☐ N ☒ Composite Sample I.D. No.: NA

Describe Compositing: NA

SAMPLE TYPES COLLECTED

Type[2]	Volume	Per Sample?		Per Composite?	
Arsenic	4-oz. jar	Y ☒	N ☐	Y ☐	N ☐
		Y ☐	N ☐	Y ☐	N ☐
		Y ☐	N ☐	Y ☐	N ☐
		Y ☐	N ☐	Y ☐	N ☐

Number of Containers: 3

Date Received by Lab: 12 / 11 / 2015 Laboratory: Test America - Pittsburgh

Weather Conditions: Sunny, 50°

Remarks:

1. Organic vapor analysis, pocket penetrometer, etc.
2. Metals, VOA, organics, etc.

WOODARD &CURRAN

SOIL SAMPLE
FIELD COLLECTION REPORT

Project Name	Delaware Valley Works	Project No.	03360.25
Date Collected	12 / 10 / 2015	Time Collected	10:35; 10:38; 10:40
Collected By	Jill Tribley Woodard & Curran		

SAMPLE(S) LOCATION SKETCH (use reverse if necessary)

Refer to Map "Proposed Direct-Push Sampling Locations, Fall 2015

Sample I.D. No.	Depth of Sample	Soil Description (Color, Composition, Staining, Odor, Field Measurements[1])
SSI-19	0'-2'	Soft to med-stiff brown to black clay w/sand, rock/conc./wood frags., dry to moist
	2'-4'	Same as above, increased clay content 3.5'-4'
	4-6'	Soft to med-stiff tan to gray sandy clay, some rock/concrete fragments, mottled, moist

Sampling Method: Geoprobe with macrocore samplers

Composite Sample? Y ☐ N ☒ Composite Sample I.D. No.: NA

Describe Compositing: NA

SAMPLE TYPES COLLECTED

Type[2]	Volume	Per Sample?		Per Composite?	
Arsenic	4-oz. jar	Y ☒	N ☐	Y ☐	N ☐
		Y ☐	N ☐	Y ☐	N ☐
		Y ☐	N ☐	Y ☐	N ☐
		Y ☐	N ☐	Y ☐	N ☐

Number of Containers: ~~3~~ 4

Date Received by Lab: 12 / 11 / 2015 Laboratory: Test America - Pittsburgh

Weather Conditions: 50s, Sunny

Remarks: DUP-3 collected at SSI-19 0'-2'

1. Organic vapor analysis, pocket penetrometer, etc.
2. Metals, VOA, organics, etc.

f17/corp

WOODARD &CURRAN

SOIL SAMPLE
FIELD COLLECTION REPORT

Project Name	Delaware Valley Works	Project No.	03360.25
Date Collected	12 / 10 / 2015	Time Collected	10:55; 10:58; 11:00
Collected By	Jill Tribley Woodard & Curran		

SAMPLE(S) LOCATION SKETCH (use reverse if necessary)

Refer to map "Proposed Direct-Push Sampling Locations, Fall 2015"

Sample I.D. No.	Depth of Sample	Soil Description (Color, Composition, Staining, Odor, Field Measurements[1])
SSE-20	0'-2'	Medium-stiff to soft, tan/brown/black sandy clay w/ rock/ brick/concrete fragments; mottled; dry to moist
	2'-4'	(Same as for 0'-2')
	4'-6'	(Same as for 0'-2')

Sampling Method: Geoprobe with macrocore samplers

Composite Sample? Y ☐ N ☒ Composite Sample I.D. No.: NA

Describe Compositing: NA

SAMPLE TYPES COLLECTED

Type[2]	Volume	Per Sample?		Per Composite?	
Arsenic	4-oz. jar	Y ☒	N ☐	Y ☐	N ☐
		Y ☐	N ☐	Y ☐	N ☐
		Y ☐	N ☐	Y ☐	N ☐
		Y ☐	N ☐	Y ☐	N ☐

Number of Containers: 3

Date Received by Lab: 12 / 11 / 2015 Laboratory: Test America - Pittsburgh

Weather Conditions: Sunny, 50s

Remarks:

1. Organic vapor analysis, pocket penetrometer, etc.
2. Metals, VOA, organics, etc.

APPENDIX C: RFI PHASE II COMMENT/RESPONSE LETTER

CUMMINGS
RITER
CONSULTANTS, INC.

November 3, 2008
Project No. 360.10/01

Mr. Russell H. Fish
Remedial Project Manager
U.S. Environmental Protection Agency
Region III, Mail Code 3 WC23
1650 Arch Street
Philadelphia, PA 19103-2029

RE: RESPONSE TO USEPA TECHNICAL REVIEW COMMENTS
RFI PHASE II REPORT
DELAWARE VALLEY WORKS - SOUTH PLANT
CLAYMONT, DELAWARE

Dear Mr. Fish:

As requested, Cummings/Riter Consultants, Inc. is providing three copies of the responses to U.S. Environmental Protection Agency comments on the Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI), Phase II Report on behalf of General Chemical LLC (General Chemical) and Honeywell International, Inc. (Honeywell). This response is specifically in regard to the technical review comments provided by U.S. Environmental Protection Agency (USEPA) (contained in your letter dated August 12, 2008).

The response has been formatted to reiterate USEPA's comments on the RFI Phase II Report, and provide the coordinated responses from General Chemical and Honeywell. Referenced tables and figures within the response are also included as attachments.

COMMENT NO. 1: Section 2.1.2 Quality Assurance/Quality Control - This section is vague, please reference QA/QC of the Ground Water Investigation section 3.1.3 of the Phase II RFI in order to elaborate on Trip Blank samples, Duplicates, Matrix Spike/Matrix Spike Duplicates, and Field Equipment blanks. Also, please list sample locations where QA/QC procedures were used.

RESPONSE: Section 2.1.2 will be revised as follows:

In addition to the soil samples, Cummings/Riter Consultants, Inc. (Cummings/Riter) collected quality assurance samples as a measure of analytical precision and as a check on the effectiveness of equipment decontamination procedures. The quality assurance/quality control (QA/QC) field sampling schedule was as follows:

Matrix Spike/Matrix Spike Duplicate (MS/MSD): For each batch of samples, the laboratory-selected samples for completing MS/MSD analyses which are summarized in the data validation reports are contained in Appendix C-1.

Field Duplicates: The collection frequency of duplicate samples is 10 percent or one field duplicate for every ten samples of the same matrix. Five duplicate samples were collected at

10 Duff Road • Suite 500 • Pittsburgh, PA 15235
(412) 241-4500 • FAX (412) 241-7500 • E-Mail: crc@cummingsriter.com

Sample Locations Solid Waste Management Unit (SWMU)5-3A, SWMU5-10A, SWMU35-3, Area of Concern (AOC)7-2, and AOC14-1, and analyzed for the complete analytical program specific to each sample. Data are included in the specific tables for each SWMU or AOC.

Trip Blanks: Trip blanks were prepared in the laboratory by pouring deionized, distilled water into sample vials. The trip blanks were then shipped from the laboratory to the field, and then returned with the collected soil samples back to the laboratory. Trip blanks were not opened in the field. The collection frequency for trip blanks was one per cooler of volatile organic compound (VOC) samples shipped to the laboratory. Three trip blanks were submitted with the soil samples and analyzed for VOCs by the laboratory as summarized in Table 2-3.

Equipment Rinsate Blanks: Rinsate blanks were submitted at a frequency of about one per every ten soil samples collected. These were prepared by passing laboratory-grade water over the non-dedicated field equipment used during soil sampling following decontamination to evaluate the potential cause of cross-contamination by the reuse of equipment. Three equipment blanks were collected during the soil sampling program and analyzed for the complete analytical program as summarized in Table 2-3.

COMMENT NO. 2: Section 2.3 - This section provides some very general conclusions about the impacts to soil, based on the analysis of samples collected during Phase II. A complete review of the status of SWMUs and AOCs at the south plant is not possible because this report includes only data from the Phase II activities. Soil results from Phase I should be included for a thorough evaluation of actions to be taken at the south plant. Please revise by incorporating the soil results of Phases I & I1 and groundwater results for each unit to draw conclusions on a unit specific and constituent specific basis. This is necessary to identify potential source areas. It will also be used to determine which units do not need to be carried forward to the risk assessment and CMS.

RESPONSE: In response to this comment, Phase I soil sample analytical results have been added to Figures 2-4 through 2-7 for arsenic, lead, benzo(a)pyrene, and other parameters where exceedances were observed (respectively). These updated figures are provided in Attachment A. As discussed with the U.S. Environmental Protection Agency (USEPA), Phase I and Phase II groundwater results at and in the vicinity of the SWMUs and AOCs are included in the response the USEPA Comment No. 9.

COMMENT NO. 3: The report focuses on arsenic, lead, and benzo(a)pyrene as the primary contaminants present above screening concentrations. However, PCBs are reported at concentrations above industrial screening concentrations in 50% of the samples obtained at SWMU 34 and 35. Unlike contaminants associated with pyritic ores, the presence of PCBs is clearly associated with activities at SWMU 34 and 35. This contaminant must be included in planning for future work to be performed at the south plant. ***(In addition, the source of many contaminants reported for sampling at Phase II SWMUs and AOCs is claimed to be storage and placement of pyritic ores. However, the source of the contaminants does not change the fact that these contaminants are associated with unacceptable risks to industrial receptors. This is an important consideration for future workers when the site will no longer be under the control of the current owner.)***

RESPONSE: Polychlorinated biphenyls (PCBs) will be included when planning future activities. It should be noted that the PCB concentrations above industrial screening values are presented on

Figure 2-7 of the Phase II report. Additionally, although present at concentrations above the $1x10^{-6}$ risk screening criteria, all concentrations are below a $1x10^{-5}$ risk screening value which is more applicable to this type of industrial property. Nevertheless, this constituent will be included in planning to ensure future industrial workers are not exposed to unacceptable risks from PCBs.

COMMENT NO. 4: Section 3.1.3 Quality Assurance/Quality Control- Please list sample locations where QA/QC procedures were used.

RESPONSE:

Field Sample ID	Date Sampled	VOC	SVOC	Pesticides	Total Metals	Dissolved Metals	Sample Type
W112-HP03MS_121306	12/13/2006	X	X	X	X		MS
W112-HP03MSD_121306	12/13/2006	X	X	X	X		MSD
Trip Blank	12/13/2006	X					TB
W112-HP03MS_121306	12/13/2006					X	MS
W112-HP03MSD_1231306	12/13/2006					X	MSD
SWMU1-HP01_121406	12/14/2006				X		REG
SWMU1-HP01MS_121406	12/14/2006				X		MS
SWMU1-HP01MSD_121406	12/14/2006				X		MSD
SWMU1-HP02D_121406	12/14/2006				X		FD
W106-HP03D_121406	12/14/2006	X	X	X	X		FD
Rinsate_121406	12/14/2006	X	X	X	X		FB
Trip Blank	12/14/2006	X					TB
W106-HP01D_121506	12/15/2006	X	X	X	X		FD
Trip Blank	12/18/2006	X					TB
SWMU1-HP01MS_121406	12/14/2006					X	MS
SWMU1-HP01MSD_121406	12/14/2006					X	MSD
SWMU1-HP02D_121406	12/14/2006					X	FD
W106-HP03D_121406	12/14/2006					X	FD
Rinsate_121406	12/14/2006					X	FB
W106-HP01D_121506	12/15/2006					X	FD

Notes:

FD = field duplicate
MS = matrix spike
MSD = matrix spike duplicate
TB = trip blank
VOC = volatile organic compound
SVOC = semivolatile organic compound

COMMENT NO. 5: Section 3.1.4 Decontamination- This section is vague please elaborate on the specifics of the decontamination process and include what specifically was decontaminated.

RESPONSE: Decontamination of equipment and apparatus used in collection of groundwater samples was performed to minimize the potential for cross-contamination. The Geoprobe® rods were decontaminated between borings by scrubbing with a non-phosphate detergent rinse (e.g., Micro solution) and followed by a potable water rinse. This decontamination was performed at an area on site designated for this purpose. All other apparatus used during the groundwater sample collection was decontaminated between each sample and/or measurement collected by washing

with a non-phosphate detergent rinse (e.g., Micro solution) and followed by a distilled/deionized water rinse. All sampling equipment was used immediately following decontamination. Dedicated tubing was used to convey samples from the boring to sample containers. All decontamination fluids were collected in 55-gallon drums and properly disposed.

COMMENT NO. 6: Section 3.2.7, AOC 11 Area- Note that there are no MCLs for nickel, vanadium, or zinc. RBCs should be used for risk-based screening of these metals.

RESPONSE: Dissolved nickel (8,840 micrograms per liter (µg/l]), dissolved vanadium (5,390 µg/l), and dissolved zinc (13,900 µg/l) exceeded their respective USEPA Region III Tap Water risk-based concentrations (RBCs); there are no Maximum Contaminant Levels (MCLs) for these metals. Results of the AOC 11 sampling are presented on the revised figures prepared in response to Comment No. 9 below and in Tables 3-1 through 3-5 of the draft RFI Phase II Report.

COMMENT NO. 7: Section 3.4.1, Groundwater Quality Findings: Arsenic detections are described at four locations, and are described as localized in limited in extent at three of the four locations. However, the actual extent of arsenic contamination in groundwater should be determined by groundwater samples at or below health based values (RBCs or MCLs). Based on groundwater data presented in the Phase I1 FWI, the actual extent of arsenic contamination in groundwater cannot be determined.

RESPONSE: When considering the combined dissolved arsenic data from the Phase II and the 2003 Phase I sampling events, the areas of arsenic impacts are reasonably mapable and do depict four general areas of the site, as described in Section 3.4.1, where arsenic is elevated in excess of 50 µg/l separated by areas where arsenic is not detected or arsenic concentrations are below RBCs or MCLs.

COMMENT NO. 8: Similarly, it can be argued that the presence of thallium and cadmium in groundwater is not limited in extent, since these metals were reported at three (cadmium) or two (thallium) groundwater investigation sites.

RESPONSE: With regard to dissolved thallium, both locations in the Phase II data where it was detected in groundwater (SAL3 and W-115) are discrete locations surrounded by other sample locations where thallium was not detected. Cadmium was detected above its MCL at AOC11 (one location), W106 (two out of four sample locations), W114 (one out of one sample location), SAL3 (two out of three sample locations), W112 (two out of three sample locations), and W115 (three out of four sample locations). While cadmium was rather wide spread, it was not detected at all locations within individual areas of interest or all locations sampled at the site.

COMMENT NO. 9: Figure 3-1 - Include groundwater results from the previous sampling event. In addition, groundwater results from the Honeywell site may be relevant to include. Please revise to create maps for each suite of constituents (e.g. metals, VOCs).

RESPONSE: Figure 3-1 has been separated into individual figures representing VOCs, semivolatile organic compounds (SVOCs), dissolved metals, and pesticides. Each figure includes a summary of Phase I and Phase II data. Copies of each of these new figures are provided in Attachment B.

COMMENT NO. 10: Figure 3-2 and 3-3 - Many wells do not include water elevation data. Please explain why the results are limited to select wells. The contouring does not honor the data from SAL-3 in the January 2007 water elevation data. Data from MW-115 is not honored from the General Chemical sampling event dated March 2007. Please explain why these data points are being disregarded and collect two rounds of water elevation data using all available wells.

RESPONSE: Pursuant to USEPA's comment, MACTEC conducted two full rounds of water level measurements during July and August 2008. The data are provided in Table 3-X (Attachment C). As can be seen on Table 3-X, some of the monitoring wells on the site could not be located by field staff and some wells have obstructions. This is why earlier surveys did not include all wells.

Two new groundwater contour maps were created from the July and August 2008 measurements, and are provided in Attachment D.

The groundwater elevation contours on the original Figures 3-2 and 3-3 have been revised to recognize the data from SAL3 for January 2007 and MW115 for March 2007. Copies of the revised figures are provided in Attachment D.

Sincerely,
Cummings/Riter Consultants, Inc.

Robert C. Hendricks, P.G.
Vice President

RCH/jar
Attachments

cc: Dean A. Calland, Esq. – Babst, Calland, Clements & Zomnir (1 copy)
Mr. Michael Macheska, II – Delaware Department of Natural Resources and Environmental Control (2 copies)
Mr. Michael Ware – General Chemical Corporation (3 copies)
Mr. Richard Karr, P.G. – MATEC Engineering and Consulting, Inc. (1 copy)
Mr. Prashant Gupta – Honeywell International, Inc. (1 copy)

ATTACHMENT A

CUMMINGS RITER

DRAWING NUMBER 03360E24

DELAWARE COUNTY, PENNSYLVANIA
NEW CASTLE COUNTY, DELAWARE

SUN OIL COMPANY

SOUTH PLANT

HONEYWELL PROPERTY

CONRAIL

TANK 15

AOC 1
AOC 2
AOC 4
AOC 5
AOC 6
AOC 8
AOC 9
AOC 10
AOC 11
AOC 12
AOC 13
AOC 14
AOC 15
AOC 16

MW-101
MW-103
MW-105
MW-106
MW-107
MW-108
MW-109
MW-110
MW-111
MW-112
MW-113
MW-114
MW-115

SCALE
100 0 100 200 FEET

LEGEND

- MW-101 — RFI PHASE I MONITORING WELL INSTALLED IN NOVEMBER AND DECEMBER 2002
- B-3 — HISTORICAL GROUNDWATER MONITORING WELL LOCATION
- RFI PHASE I SOIL SAMPLING LOCATION
- RFI PHASE II SOIL SAMPLING LOCATION
- RFI PHASE II PIEZOMETER LOCATION
- RFI PHASE II HYDROPUNCH LOCATION
- 445/398/204 — THE SECOND AND THIRD RESULTS ARE FROM DEEPER SAMPLE DEPTHS
- 16.3(18.8) — DUPLICATE SAMPLE RESULT IS INDICATED IN PARENTHESES
- PROPERTY BOUNDARY
- TOPOGRAPHIC CONTOURS
- RFI PHASE I SOLID WASTE MANAGEMENT UNITS
- RFI PHASE II SOLID WASTE MANAGEMENT UNITS
- RFI PHASE I AREA OF CONCERN (AOC)
- RFI PHASE II AREA OF CONCERN (AOC)

NOTE

1. FACILITY GRID IS BASED ON DELAWARE STATE PLANE MERIDIAN, NAD 27.
2. SOIL RESULTS ARE IN MILLIGRAMS PER KILOGRAM.
3. ALL SOIL SAMPLE ARSENIC RESULTS EXCEED BOTH THE USEPA REGION III SOIL SCREENING LEVEL FOR GROUNDWATER MIGRATION, DILUTION ATTENUATION FACTOR=20 (0.026 mg/kg); OR THE USEPA REGION III RISK-BASED CONCENTRATION FOR INDUSTRIAL SOIL (1.9 mg/kg).
4. "NA" INDICATES PARAMETER NOT ANALYZED

REFERENCE: EARTH SCIENCES CONSULTANTS, INC. DRAWING NO. 5455415.

ADDITIONAL SOLID WASTE MANAGEMENT UNITS (RFI PHASE II)

33. FORMER SPRAY POND AREA
34. FORMER WASTE OIL STORAGE PAD
35. FORMER HAZARDOUS WASTE STORAGE PAD
36. FORMER ALUM PLANT AREA/DEBRIS STAGING AREA

ADDITIONAL AREAS OF CONCERN (RFI PHASE II)

AOC 5 – FORMER SULFUR STORAGE TANK SPILL
AOC 6 – FORMER ABOVEGROUND FUEL STORAGE TANK A
AOC 7 – FORMER SULFURIC ACID PLANT–UNPAVED AREA
AOC 8 – FORMER SPENT SULFURIC ACID LOADING/UNLOADING AREA SUMPS
AOC 9 – FORMER SPENT SULFURIC ACID STORAGE AREA SUMPS
AOC 10 – FORMER SULFURIC ACID PLANT AREA – ACID AND CAUSTIC STORAGE TANK AREA SUMPS
AOC 11 – FORMER CONTACT SULFURIC ACID PLANT AREA A – AST AREA SUMPS AND BUILDING SUMP
AOC 12 – FORMER CONTACT SULFURIC ACID PLANT AREA B – AST AREA SUMPS
AOC 13 – FORMER PHOTOSALTS PLANT STORAGE TANK AREA SUMPS
AOC 14 – FORMER SULFURIC ACID STORAGE TANK AREA SUMP
AOC 15 – FORMER ACID LOADING/UNLOADING AREA SUMPS
AOC 16 – FORMER ABOVEGROUND FUEL OIL STORAGE TANK C

AREAS OF CONCERN (RFI PHASE I)

AOC 1 – TANK 15 SPILL AREA
AOC 2 – ACID SPILL AREA
AOC 4 – CONRAIL FUEL SPILL AREA

SOLID WASTE MANAGEMENT UNITS (RFI PHASE I)

1. NORTH PHOSPHORIC ACID POND
2. SOUTH PHOSPHORIC ACID POND
3. RED MUD SLURRY POND A
4. RED MUD SLURRY POND B
5. SPAR BUILDING STORAGE AREA
6. SOUTH TREATMENT PLANT, DRUM STORAGE
7. EFFLUENT CLARIFIER
8. EFFLUENT CLARIFIER
10. SOUTH WASTE TREATMENT STORAGE PAD
11. WASTE OIL AST
12. WASTE OIL UST
26. SOUTH WASTE TREATMENT PLANT
28. HYPO MUDS ACCUMULATION (2 AREAS)
31. FORMER SPENT ACID LAGOON
32. FORMER UST AREA

REVISIONS

REV.	DESCRIPTION	DATE	APPROVED

FIGURE 2-4

RFI PHASE II ARSENIC EXCEEDANCES IN SOIL

DELAWARE VALLEY WORKS (SOUTH PLANT)
CLAYMONT, DELAWARE

PREPARED FOR
GENTEK, INC.
PARSIPPANY, NEW JERSEY

CUMMINGS RITER CONSULTANTS, INC.
CORPORATE HEADQUARTERS
10 Duff Road
Duff Office Center, Suite 500
Pittsburgh, PA 15235
(412) 241-4500
Fax: (412) 241-7500

SIZE	SCALE	REV.	DRAWING NUMBER
E	1" = 100'	–	03360E24

DRAWN BY:	T.N. Fitzroy	DATE: 10-17-08
CHECKED BY:	M.J. Valentine	DATE: 10-30-08
APPROVED BY:	R.C. Hendricks	DATE: 10-30-08

PLOT SCALE: 1=1

DRAWING NUMBER 03360E18

DELAWARE COUNTY, PENNSYLVANIA
NEW CASTLE COUNTY, DELAWARE

SUN OIL COMPANY

SOUTH PLANT

HONEYWELL PROPERTY

CONRAIL

DELAWARE RIVER

TANK 15

AOC 1
AOC 2
AOC 4
AOC 5
AOC 6
AOC 8
AOC 9
AOC 10
AOC 11
AOC 12
AOC 13
AOC 14
AOC 15
AOC 16

MW-101
MW-103
MW-105
MW-106
MW-107
MW-108
MW-109
MW-110
MW-111
MW-112
MW-113
MW-114
MW-115

W112-HP01
W112-HP02
W112-HP03
W112-HP04
W106-HP01
W106-HP02
W106-HP03
W106-HP04
W114-HP01
W114-HP02
W115-GW01
W115-GW02
W115-GW03
W115-GW04

SAL-1
SAL-2
SAL-3
SAL-4
SAL3-HP01
SAL3-HP02
SAL3-HP03
SAL3-HP04

B28-A
B28-B
B28-C
B-1
B-2/B-2D
B-3
B-4
B-5/B-5D
B1-A
B5-A
B5-B
B5-C
B5-D

SWMU33-1
SWMU34-1
SWMU34-2
SWMU35-1
SWMU35-2
SWMU35-3
SWMU35-4
SWMU36-1
SWMU36-2
SWMU36-3
SWMU36-4
SWMU36-5
SWMU36-6
SWMU36-7
SWMU36-8

SCALE
100 0 100 200 FEET

LEGEND

MW-101	RFI PHASE I MONITORING WELL INSTALLED IN NOVEMBER AND DECEMBER 2002
B-3	HISTORICAL GROUNDWATER MONITORING WELL LOCATION
	RFI PHASE I SOIL SAMPLING LOCATION
	RFI PHASE II SOIL SAMPLING LOCATION
	RFI PHASE II PIEZOMETER LOCATION
	RFI PHASE II HYDROPUNCH LOCATION
1,480(A)/5,370(B)/2,110(C)	WHERE APPROPRIATE, DEPTH INTERVAL IS INDICATED IN PARENTHESES (A) IS THE SHALLOWEST DEPTH INTERVAL. (B) IS THE INTERMEDIATE DEPTH INTERVAL. (C) IS THE DEEPEST DEPTH INTERVAL
	PROPERTY BOUNDARY
15	TOPOGRAPHIC CONTOURS
	RFI PHASE I SOLID WASTE MANAGEMENT UNITS
	RFI PHASE II SOLID WASTE MANAGEMENT UNITS
	RFI PHASE I AREA OF CONCERN (AOC)
	RFI PHASE II AREA OF CONCERN (AOC)

ADDITIONAL SOLID WASTE MANAGEMENT UNITS (RFI PHASE II)

33. FORMER SPRAY POND AREA
34. FORMER WASTE OIL STORAGE PAD
35. FORMER HAZARDOUS WASTE STORAGE PAD
36. FORMER ALUM PLANT AREA/DEBRIS STAGING AREA

ADDITIONAL AREAS OF CONCERN (RFI PHASE II)

AOC 5 – FORMER SULFUR STORAGE TANK SPILL
AOC 6 – FORMER ABOVEGROUND FUEL STORAGE TANK A
AOC 7 – FORMER SULFURIC ACID PLANT–UNPAVED AREA
AOC 8 – FORMER SPENT SULFURIC ACID LOADING/UNLOADING AREA SUMPS
AOC 9 – FORMER SPENT SULFURIC ACID STORAGE AREA SUMPS
AOC 10 – FORMER SULFURIC ACID PLANT AREA – ACID AND CAUSTIC STORAGE TANK AREA SUMPS
AOC 11 – FORMER CONTACT SULFURIC ACID PLANT AREA A – AST AREA SUMPS AND BUILDING SUMP
AOC 12 – FORMER CONTACT SULFURIC ACID PLANT AREA B – AST AREA SUMPS
AOC 13 – FORMER PHOTOSALTS PLANT STORAGE TANK AREA SUMPS
AOC 14 – FORMER SULFURIC ACID STORAGE TANK AREA SUMP
AOC 15 – FORMER ACID LOADING/UNLOADING AREA SUMPS
AOC 16 – FORMER ABOVEGROUND FUEL OIL STORAGE TANK C

AREAS OF CONCERN (RFI PHASE I)

AOC 1 – TANK 15 SPILL AREA
AOC 2 – ACID SPILL AREA
AOC 4 – CONRAIL FUEL SPILL AREA

SOLID WASTE MANAGEMENT UNITS (RFI PHASE I)

1. NORTH PHOSPHORIC ACID POND
2. SOUTH PHOSPHORIC ACID POND
3. RED MUD SLURRY POND A
4. RED MUD SLURRY POND B
5. SPAR BUILDING STORAGE AREA
6. SOUTH TREATMENT PLANT, DRUM STORAGE
7. EFFLUENT CLARIFIER
8. EFFLUENT CLARIFIER
10. SOUTH WASTE TREATMENT STORAGE PAD
11. WASTE OIL AST
12. WASTE OIL UST
26. SOUTH WASTE TREATMENT PLANT
28. HYPO MUDS ACCUMULATION (2 AREAS)
31. FORMER SPENT ACID LAGOON
32. FORMER UST AREA

NOTE

1. FACILITY GRID IS BASED ON DELAWARE STATE PLANE MERIDIAN, NAD 27.
2. SOIL RESULTS ARE IN MILLIGRAMS PER KILOGRAM.
3. LEAD RESULTS WHICH EXCEED THE USEPA REGION III RISK–BASED CONCENTRATION FOR INDUSTRIAL SOIL (800 mg/kg) ARE SHOWN.
4. RESULTS ARE FROM THE 0–6 INCH DEPTH INTERVAL UNLESS OTHERWISE INDICATED IN PARENTHESES.
5. "NA" INDICATES PARAMETER NOT ANALYZED

REFERENCE: EARTH SCIENCES CONSULTANTS, INC. DRAWING NO. 5465415.

PLOT SCALE: 1=1

REVISIONS			
REV.	DESCRIPTION	DATE	APPROVED

CUMMINGS RITER CONSULTANTS, INC.
CORPORATE HEADQUARTERS
10 Duff Road
Duff Office Center, Suite 500
Pittsburgh, PA 15235
(412) 241–4500
Fax: (412) 241–7500

FIGURE 2–5
RFI PHASE II LEAD EXCEEDANCES IN SOIL

DELAWARE VALLEY WORKS (SOUTH PLANT)
CLAYMONT, DELAWARE

PREPARED FOR
GENTEK, INC.
PARSIPPANY, NEW JERSEY

SIZE	SCALE	REV.	DRAWING NUMBER
E	SCALE: 1" = 100'	–	03360E18

DRAWN BY:	T.N. Fitzroy	DATE: 4–17–07
CHECKED BY:	M.J. Valentine	DATE: 6–15–07
APPROVED BY:	R.C. Hendricks	DATE: 6–15–07

DRAWING NUMBER 03360E19

DELAWARE COUNTY, PENNSYLVANIA
NEW CASTLE COUNTY, DELAWARE

SUN OIL COMPANY

SOUTH PLANT

CONRAIL

HONEYWELL PROPERTY

DELAWARE RIVER

TANK 15

AOC 1
AOC 2
AOC 4
AOC 5
AOC 6
AOC 8
AOC 9
AOC 10
AOC 11
AOC 12
AOC 13
AOC 14
AOC 15
AOC 16

MW-101
MW-103
MW-105
MW-106
MW-107
MW-108
MW-109
MW-110
MW-111
MW-112
MW-113
MW-114
MW-115

W112-HP01
W112-HP02
W112-HP03
W112-HP04
W106-HP01
W106-HP02
W106-HP03
W106-HP04
W114-HP01
W114-HP02
W115-GW01
W115-GW02
W115-GW03
W115-GW04

SAL3-HP01
SAL3-HP02
SAL3-HP03
SAL3-HP04

AOC8-HP01

B28-A
B28-B
B28-C
B29-A
B29-B
B29-C
B1-A
B1-B
B2-A
B2-B
B3-A
B3-B
B4-A
B4-B
B5-A
B5-B
B-1
B-2/B-2D
B-3
B-4
B-5/B-5D

SAL-1
SAL-2
SAL-3
SAL-4

SWMU1-1
SWMU1-2
SWMU1-HP01
SWMU1-HP02
SWMU5-1
SWMU5-2
SWMU5-3
SWMU5-4
SWMU5-5
SWMU5-6
SWMU5-7
SWMU5-8
SWMU5-9
SWMU5-10
SWMU5-11
SWMU5-12
SWMU5-13
SWMU5-14
SWMU5-15
SWMU5-16
SWMU13-1
SWMU13-2
SWMU33-1
SWMU35-1
SWMU35-2
SWMU35-3
SWMU35-4
SWMU36-1
SWMU36-2
SWMU36-3
SWMU36-4
SWMU36-5
SWMU36-6
SWMU36-7
SWMU36-8

AOC1-1
AOC2-1
AOC2-2
AOC3-1
AOC3-2
AOC3-3
AOC4-1
AOC4-2
AOC5-1
AOC5-2
AOC5-3
AOC5-4
AOC5-5
AOC6-1
AOC6-2
AOC7-1
AOC7-2
AOC7-3
AOC7-4
AOC7-5
AOC7-6
AOC8-1
AOC8-2
AOC9-1
AOC9-2
AOC10-1
AOC10-2
AOC14-1
AOC15-1
AOC15-2
AOC16-1
AOC16-2
AOC16-3
AOC16-4
AOC16-5
AOC16-6

LEGEND

MW-101	RFI PHASE I MONITORING WELL INSTALLED IN NOVEMBER AND DECEMBER 2002
B-3	HISTORICAL GROUNDWATER MONITORING WELL LOCATION
	RFI PHASE I SOIL SAMPLING LOCATION
	RFI PHASE II SOIL SAMPLING LOCATION
	RFI PHASE II PIEZOMETER LOCATION
	RFI PHASE II HYDROPUNCH LOCATION
830(A)/480(B)/3,100(C)	DEPTH INTERVAL IS INDICATED IN PARENTHESES. (A) IS THE SHALLOWEST DEPTH INTERVAL. (C) IS THE DEEPEST DEPTH INTERVAL.
	PROPERTY BOUNDARY
15	TOPOGRAPHIC CONTOURS
	RFI PHASE I SOLID WASTE MANAGEMENT UNITS
	RFI PHASE II SOLID WASTE MANAGEMENT UNITS
	RFI PHASE I AREA OF CONCERN (AOC)
	RFI PHASE II AREA OF CONCERN (AOC)

NOTE

1. FACILITY GRID IS BASED ON DELAWARE STATE PLANE MERIDIAN, NAD 27.
2. SOIL RESULTS ARE IN MICROGRAMS PER KILOGRAM
3. BENZO(a)PYRENE RESULTS WHICH EXCEED THE USEPA REGION III SOIL SCREENING LEVEL FOR GROUNDWATER MIGRATION, DILUTION ATTENUATION FACTOR=20 (120µg/kg) ARE SHOWN. RESULTS SHOWN IN RED ALSO EXCEED THE USEPA REGION III RISK BASED CONCENTRATION FOR INDUSTRIAL SOIL (390µg/kg).
4. RESULTS ARE FROM THE 0–6 INCH DEPTH INTERVAL UNLESS OTHERWISE INDICATED IN PARENTHESES.
5. "NA" INDICATES PARAMETER NOT ANALYZED

REFERENCE: EARTH SCIENCES CONSULTANTS, INC. DRAWING NO. 5465415.

ADDITIONAL SOLID WASTE MANAGEMENT UNITS (RFI PHASE II)

33. FORMER SPRAY POND AREA
34. FORMER WASTE OIL STORAGE PAD
35. FORMER HAZARDOUS WASTE STORAGE PAD
36. FORMER ALUM PLANT AREA/DEBRIS STAGING AREA

ADDITIONAL AREAS OF CONCERN (RFI PHASE II)

AOC 5 – FORMER SULFUR STORAGE TANK SPILL
AOC 6 – FORMER ABOVEGROUND FUEL STORAGE TANK A
AOC 7 – FORMER SULFURIC ACID PLANT–UNPAVED AREA
AOC 8 – FORMER SPENT SULFURIC ACID LOADING/UNLOADING AREA SUMPS
AOC 9 – FORMER SPENT SULFURIC ACID STORAGE AREA SUMPS
AOC 10 – FORMER SULFURIC ACID PLANT AREA – ACID AND CAUSTIC STORAGE TANK AREA SUMPS
AOC 11 – FORMER CONTACT SULFURIC ACID PLANT AREA A – AST AREA SUMPS AND BUILDING SUMP
AOC 12 – FORMER CONTACT SULFURIC ACID PLANT AREA B – AST AREA SUMPS
AOC 13 – FORMER PHOTOSALTS PLANT STORAGE TANK AREA SUMPS
AOC 14 – FORMER SULFURIC ACID STORAGE TANK AREA SUMP
AOC 15 – FORMER ACID LOADING/UNLOADING AREA SUMPS
AOC 16 – FORMER ABOVEGROUND FUEL OIL STORAGE TANK C

AREAS OF CONCERN (RFI PHASE I)

AOC 1 – TANK 15 SPILL AREA
AOC 2 – ACID SPILL AREA
AOC 4 – CONRAIL FUEL SPILL AREA

SOLID WASTE MANAGEMENT UNITS (RFI PHASE I)

1. NORTH PHOSPHORIC ACID POND
2. SOUTH PHOSPHORIC ACID POND
3. RED MUD SLURRY POND A
4. RED MUD SLURRY POND B
5. SPAR BUILDING STORAGE AREA
6. SOUTH TREATMENT PLANT, DRUM STORAGE
7. EFFLUENT CLARIFIER
8. EFFLUENT CLARIFIER
10. SOUTH WASTE TREATMENT STORAGE PAD
11. WASTE OIL AST
12. WASTE OIL UST
26. SOUTH WASTE TREATMENT PLANT
28. HYPO MUDS ACCUMULATION (2 AREAS)
31. FORMER SPENT ACID LAGOON
32. FORMER UST AREA

SCALE
100 0 100 200 FEET

PLOT SCALE: 1=1

REVISIONS			
REV.	DESCRIPTION	DATE	APPROVED

CUMMINGS RITER CONSULTANTS, INC.
CORPORATE HEADQUARTERS
10 Duff Road
Duff Office Center, Suite 500
Pittsburgh, PA 15235
(412) 241-4500
Fax: (412) 241-7500

FIGURE 2–6

RFI PHASE II BENZO(a)PYRENE EXCEEDANCES IN SOIL

DELAWARE VALLEY WORKS (SOUTH PLANT)
CLAYMONT, DELAWARE

PREPARED FOR
GENTEK, INC.
PARSIPPANY, NEW JERSEY

SIZE	SCALE	REV.	DRAWING NUMBER
E	SCALE: 1" = 100'	–	03360E19

DRAWN BY:	T.N. Fitzroy	DATE: 4–17–07
CHECKED BY:	M.J. Valentine	DATE: 6–15–07
APPROVED BY:	R.C. Hendricks	DATE: 6–15–07

DRAWING NUMBER 03360E25

DELAWARE COUNTY, PENNSYLVANIA
NEW CASTLE COUNTY, DELAWARE

SUN OIL COMPANY

SOUTH PLANT

HONEYWELL PROPERTY

CONRAIL

TANK 15

DELAWARE RIVER

AOC 1 AOC 2 AOC 4 AOC 5 AOC 6 AOC 7 AOC 8 AOC 9 AOC 10 AOC 11 AOC 12 AOC 13 AOC 14 AOC 15 AOC 16

MW-101 MW-103 MW-105 MW-106 MW-107 MW-108 MW-109 MW-110 MW-111 MW-112 MW-113 MW-114 MW-115

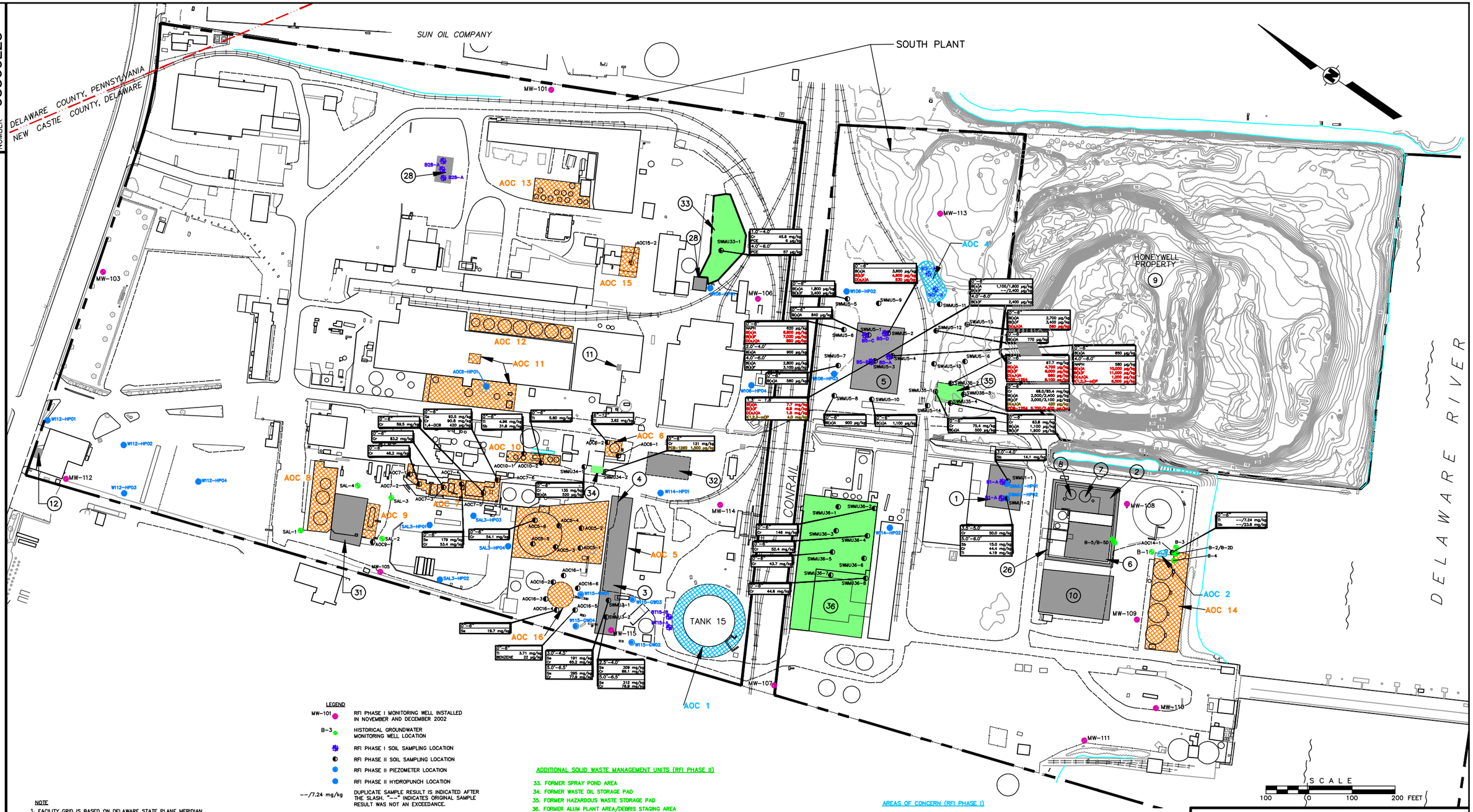
W12-HP01 W12-HP02 W12-HP03 W12-HP04 W106-HP01 W106-HP02 W106-HP03 W106-HP04 W114-HP01 W114-HP02 W115-GW01 W115-GW02 W115-GW03 W115-GW04 W115-P1 W115-P2 W115-P3

SAL-1 SAL-2 SAL-3 SAL-4 SAL3-HP01 SAL3-HP02 SAL3-HP03 SAL3-HP04

B-1 B-2/B-2D B-3 B-4 B-5/B-5D B1-A B2-A B28-A B28-B B28-C B5-A B5-B B5-C B5-D

SWMU1-1 SWMU1-2 SWMU3-1 SWMU3-2 SWMU5-1 SWMU5-2 SWMU5-3 SWMU5-4 SWMU5-5 SWMU5-6 SWMU5-7 SWMU5-8 SWMU5-9 SWMU5-10 SWMU5-11 SWMU5-12 SWMU5-13 SWMU5-14 SWMU5-15 SWMU5-16 SWMU33-1 SWMU34-1 SWMU34-2 SWMU35-1 SWMU35-2 SWMU35-3 SWMU35-4 SWMU36-1 SWMU36-2 SWMU36-3 SWMU36-4 SWMU36-5 SWMU36-6 SWMU36-7 SWMU36-8

AOC16-1 AOC16-2 AOC16-3 AOC16-4 AOC16-5 AOC16-6 AOC15-2 AOC10-1 AOC10-2 AOC7-1 AOC7-2 AOC7-3 AOC7-4 AOC7-5 AOC7-6 AOC5-1 AOC5-2 AOC5-3 AOC5-4 AOC5-5 AOC5-6 AOC6-1 AOC6-2 AOC9 AOC14-1



SCALE
100 0 100 200 FEET

LEGEND

MW-101	RFI PHASE I MONITORING WELL INSTALLED IN NOVEMBER AND DECEMBER 2002
B-3	HISTORICAL GROUNDWATER MONITORING WELL LOCATION
	RFI PHASE I SOIL SAMPLING LOCATION
	RFI PHASE II SOIL SAMPLING LOCATION
	RFI PHASE II PIEZOMETER LOCATION
	RFI PHASE II HYDROPUNCH LOCATION
--/7.24 mg/kg	DUPLICATE SAMPLE RESULT IS INDICATED AFTER THE SLASH. "--" INDICATES ORIGINAL SAMPLE RESULT WAS NOT AN EXCEEDANCE.
	PROPERTY BOUNDARY
10	TOPOGRAPHIC CONTOURS
	RFI PHASE I SOLID WASTE MANAGEMENT UNITS
	RFI PHASE II SOLID WASTE MANAGEMENT UNITS
	RFI PHASe I AREA OF CONCERN (AOC)
	RFI PHASe II AREA OF CONCERN (AOC)

NOTE

1. FACILITY GRID IS BASED ON DELAWARE STATE PLANE MERIDIAN, NAD 27.
2. RESULTS SHOWN IN BLACK EXCEED THE CORRESPONDING USEPA REGION III SOIL SCREENING LEVEL (SSL) FOR GROUNDWATER MIGRATION, DILUTION ATTENUATION FACTOR=20. RESULTS SHOWN IN BROWN EXCEED THE CORRESPONDING USEPA REGION III RISK-BASED CONCENTRATION (RBC) FOR INDUSTRIAL SOIL. RESULTS SHOWN IN RED EXCEED BOTH THE CORRESPONDING SSL AND RBC.
3. ABBREVIATIONS:
   Sb = ANTIMONY
   Cr = CHROMIUM
   Se = SELENIUM
   Tl = THALLIUM
   PCE = TETRACHLOROETHENE
   B(a)A = BENZO(a)ANTHRACENE 480/3900
   B(b)F = BENZO(b)FLUORANTHENE 1500/3900
   D(a,h)A = DIBENZ(a,h)ANTHRACENE 460/390
   I(1,2,3-cd)P = INDENO(1,2,3-cd)PYRENE 4200/3900
   1,4-DCB = 1,4-DICHLOROBENZENE 7.1/120,000
   NAPH = NAPHTHALENE
   Hg = MERCURY

REFERENCE: EARTH SCIENCES CONSULTANTS, INC. DRAWING NO. 5455415.

ADDITIONAL SOLID WASTE MANAGEMENT UNITS (RFI PHASE II)

33. FORMER SPRAY POND AREA
34. FORMER WASTE OIL STORAGE PAD
35. FORMER HAZARDOUS WASTE STORAGE PAD
36. FORMER ALUM PLANT AREA/DEBRIS STAGING AREA

ADDITIONAL AREAS OF CONCERN (RFI PHASE II)

AOC 5 – FORMER SULFUR STORAGE TANK SPILL
AOC 6 – FORMER ABOVEGROUND FUEL STORAGE TANK A
AOC 7 – FORMER SULFURIC ACID PLANT–UNPAVED AREA
AOC 8 – FORMER SPENT SULFURIC ACID LOADING/UNLOADING AREA SUMPS
AOC 9 – FORMER SPENT SULFURIC ACID STORAGE AREA SUMPS
AOC 10 – FORMER SULFURIC ACID PLANT AREA – ACID AND CAUSTIC STORAGE TANK AREA SUMPS
AOC 11 – FORMER CONTACT SULFURIC ACID PLANT AREA A – AST AREA SUMPS AND BUILDING SUMP
AOC 12 – FORMER CONTACT SULFURIC ACID PLANT AREA B – AST AREA SUMPS
AOC 13 – FORMER PHOTOSALTS PLANT STORAGE TANK AREA SUMPS
AOC 14 – FORMER SULFURIC ACID STORAGE TANK AREA SUMP
AOC 15 – FORMER ACID LOADING/UNLOADING AREA SUMPS
AOC 16 – FORMER ABOVEGROUND FUEL OIL STORAGE TANK C

AREAS OF CONCERN (RFI PHASE I)

AOC 1 – TANK 15 SPILL AREA
AOC 2 – ACID SPILL AREA
AOC 4 – CONRAIL FUEL SPILL AREA

SOLID WASTE MANAGEMENT UNITS (RFI PHASE I)

1. NORTH PHOSPHORIC ACID POND
2. SOUTH PHOSPHORIC ACID POND
3. RED MUD SLURRY POND A
4. RED MUD SLURRY POND B
5. SPAR BUILDING STORAGE AREA
6. SOUTH TREATMENT PLANT, DRUM STORAGE
7. EFFLUENT CLARIFIER
8. EFFLUENT CLARIFIER
10. SOUTH WASTE TREATMENT STORAGE PAD
11. WASTE OIL AST
12. WASTE OIL UST
26. SOUTH WASTE TREATMENT PLANT
28. HYPO MUDS ACCUMULATION (2 AREAS)
31. FORMER SPENT ACID LAGOON
32. FORMER UST AREA

REVISIONS			
REV.	DESCRIPTION	DATE	APPROVED

CUMMINGS RITER CONSULTANTS, INC.
CORPORATE HEADQUARTERS
10 Duff Road
Duff Office Center, Suite 500
Pittsburgh, PA 15235
(412) 241-4500
Fax: (412) 241-7500

FIGURE 2-7

RFI PHASE II EXCEEDANCES IN SOIL ADDITIONAL PARAMETERS

DELAWARE VALLEY WORKS (SOUTH PLANT)
CLAYMONT, DELAWARE

PREPARED FOR
GENTEK, INC.
PARSIPPANY, NEW JERSEY

SIZE	SCALE	REV.	DRAWING NUMBER
E	SCALE: 1" = 100'	—	03360E25

DRAWN BY:	T.N. Fitzroy	DATE: 10-17-08
CHECKED BY:	M.J. Valentine	DATE: 10-30-08
APPROVED BY:	R.C. Hendricks	DATE: 10-30-08

PLOT SCALE: 1=1

ATTACHMENT B

CUMMINGS RITER

LEGEND

- PIEZOMETER LOCATION (W114–HP01)
- HYDROPUNCH LOCATION (W115–GW01)
- EXISTING PHASE 1 WELL LOCATION (MW–115)
- B–3 HISTORICAL GROUNDWATER MONITORING WELL LOCATION
- RFI PHASE I SOIL SAMPLING LOCATION
- APPROXIMATE RFI PHASE II SOIL SAMPLING LOCATION
- GENERAL CHEMICAL LLC PROPERTY BOUNDARY

DISSOLVED METALS reported in ug/L

SVOC's, PESTICIDES AND VOC'S reported in ug/L

NA = Not Applicable
NS = No Standard
ND = Not Detected
NAN = Not Analyzed

ANALYTICAL QUALIFIERS

J – ANALYTE DETECTED AT AN ESTIMATED CONCENTRATION ABOVE THE LABORATORY METHOD DETECTION LIMIT BUT BELOW THE LABORATORY REPORTING LIMIT.

K – ANALYTE PRESENT. REPORTED VALUE MAY BE BIASED HIGH. ACTUAL VALUE IS EXPECTED TO BE LOWER.

L – ANALYTE PRESENT. REPORTED VALUE MAY BE BIASED LOW. ACTUAL VALUE IS EXPECTED TO BE HIGHER.

D – ANALYTE PRESENT. RESULTS REPORTED FROM A DILUTED SAMPLE.

NOTES :

1. LOCATION OF IMPROVEMENTS SHOWN ARE BASED ON AN ON THE GROUND FIELD SURVEY DONE BY ND REMY ASSOCIATES DURING FEBRUARY OF 2007.

2. COORDINATES AND ELEVATIONS ON THIS DRAWING WERE OBTAINED BY GPS OBSERVATIONS ALONG WITH TRADITIONAL SURVEY METHODS DURING THE SAME SURVEY, USING USGS BENCHMARK JU0786 AS CONTROL. COORDINATES ARE GIVEN IN THE NAD83 DELAWARE STATE PLANE SYSTEM, ELEVATIONS ARE IN THE NAVD88(1991) DATUM.

3. THIS DRAWING IS FOR WELL REFERENCE ONLY; NO BOUNDARY SURVEY WAS PERFORMED FOR THIS PROJECT.

4. FACILITY GRID IS BASED ON DELAWARE STATE PLANE MERIDIAN, NAD 27.

5. Chromium RBC is for Chromium III

5. Chromium MCL is for Total Chromium

5. Manganese RBC is for non–food Manganese

6. THE PHASE I INVESTIGATION RESULTS SHOWN ARE FOR ALL DETECTED COMPOUNDS.

6. THE PHASE II INVESTIGATION RESULTS SHOWN ARE FOR COMPOUNDS WITH DETECTIONS THAT EXCEED THE EPA MCLs FOR TAP WATER OR THE REGION III RBCs FOR COMPOUNDS THAT DO NOT HAVE AN MCL.

SOLID WASTE MANAGEMENT UNITS (RFI PHASE I)

1. NORTH PHOSPHORIC ACID POND
2. SOUTH PHOSPHORIC ACID POND
3. RED MUD SLURRY POND A
4. RED MUD SLURRY POND B
5. SPAR BUILDING STORAGE AREA
6. SOUTH TREATMENT PLANT, DRUM STORAGE
7. EFFLUENT CLARIFIER
8. EFFLUENT CLARIFIER
10. SOUTH WASTE TREATMENT STORAGE PAD
11. WASTE OIL AST
12. WASTE OIL UST
26. SOUTH WASTE TREATMENT PLANT
28. HYPO MUDS ACCUMULATION (2 AREAS)
31. FORMER SPENT ACID LAGOON
32. FORMER UST AREA

ADDITIONAL SOLID WASTE MANAGEMENT UNITS (RFI PHASE II)

33. FORMER SPRAY POND AREA
34. FORMER WASTE OIL STORAGE PAD
35. FORMER HAZARDOUS WASTE STORAGE PAD
36. FORMER ALUM PLANT AREA/DEBRIS STAGING AREA

AREAS OF CONCERN (RFI PHASE I)

AOC 1 – TANK 15 SPILL AREA
AOC 2 – ACID SPILL AREA
AOC 4 – CONRAIL FUEL SPILL AREA

ADDITIONAL AREAS OF CONCERN (RFI PHASE II)

AOC 5 – FORMER SULFUR STORAGE TANK SPILL
AOC 6 – FORMER ABOVEGROUND FUEL STORAGE TANK A
AOC 7 – FORMER SULFURIC ACID PLANT–UNPAVED AREA
AOC 8 – FORMER SPENT SULFURIC ACID LOADING/UNLOADING AREA SUMPS
AOC 9 – FORMER SPENT SULFURIC ACID STORAGE AREA SUMPS
AOC 10 – FORMER SULFURIC ACID PLANT AREA – ACID AND CAUSTIC STORAGE TANK AREA SUMPS
AOC 11 – FORMER CONTACT SULFURIC ACID PLANT AREA A – AST AREA SUMPS AND BUILDING SUMP
AOC 12 – FORMER CONTACT SULFURIC ACID PLANT AREA B – AST AREA SUMPS
AOC 13 – FORMER PHOTOSALTS PLANT STORAGE TANK AREA SUMPS
AOC 14 – FORMER SULFURIC ACID STORAGE TANK AREA SUMP
AOC 15 – FORMER ACID LOADING/UNLOADING AREA SUMPS
AOC 16 – FORMER ABOVEGROUND FUEL OIL STORAGE TANK C

GRAPHIC SCALE

75 150 300 600

1 - INCH = 150 FEET

Prepared/Date: CJC 10/24/2008
Checked/Date: RCK 10/24/2008

DELAWARE VALLEY WORKS - SOUTH PLANT
Claymont, Delaware

MACTEC
MACTEC Engineering and Consulting, Inc.
5205 Militia Hill Road
Plymouth Meeting, PA

PHASE I AND PHASE II GROUNWATER SAMPLING RESULTS FOR PESTICIDES

Project 3485060089

Figure 3-X

LEGEND

- PIEZOMETER LOCATION (W114-HP01)
- HYDROPUNCH LOCATION (W115-GW01)
- EXISTING PHASE 1 WELL LOCATION (MW-115)
- HISTORICAL GROUNDWATER MONITORING WELL LOCATION (B-3)
- RFI PHASE I SOIL SAMPLING LOCATION
- APPROXIMATE RFI PHASE II SOIL SAMPLING LOCATION
- GENERAL CHEMICAL LLC PROPERTY BOUNDARY

DISSOLVED METALS reported in ug/L

SVOC's, PESTICIDES AND VOC'S reported in ug/L

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ND = Not Detected
NAN = Not Analyzed

ANALYTICAL QUALIFIERS

J – ANALYTE DETECTED AT AN ESTIMATED CONCENTRATION ABOVE THE LABORATORY METHOD DETECTION LIMIT BUT BELOW THE LABORATORY REPORTING LIMIT.

K – ANALYTE PRESENT. REPORTED VALUE MAY BE BIASED HIGH. ACTUAL VALUE IS EXPECTED TO BE LOWER.

L – ANALYTE PRESENT. REPORTED VALUE MAY BE BIASED LOW. ACTUAL VALUE IS EXPECTED TO BE HIGHER.

D – ANALYTE PRESENT. RESULTS REPORTED FROM A DILUTED SAMPLE.

NOTES :

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SOLID WASTE MANAGEMENT UNITS (RFI PHASE I)

1. NORTH PHOSPHORIC ACID POND
2. SOUTH PHOSPHORIC ACID POND
3. RED MUD SLURRY POND A
4. RED MUD SLURRY POND B
5. SPAR BUILDING STORAGE AREA
6. SOUTH TREATMENT PLANT, DRUM STORAGE
7. EFFLUENT CLARIFIER
8. EFFLUENT CLARIFIER
10. SOUTH WASTE TREATMENT STORAGE PAD
11. WASTE OIL AST
12. WASTE OIL UST
26. SOUTH WASTE TREATMENT PLANT
28. HYPO MUDS ACCUMULATION (2 AREAS)
31. FORMER SPENT ACID LAGOON
32. FORMER UST AREA

ADDITIONAL SOLID WASTE MANAGEMENT UNITS (RFI PHASE II)

33. FORMER SPRAY POND AREA
34. FORMER WASTE OIL STORAGE PAD
35. FORMER HAZARDOUS WASTE STORAGE PAD
36. FORMER ALUM PLANT AREA/DEBRIS STAGING AREA

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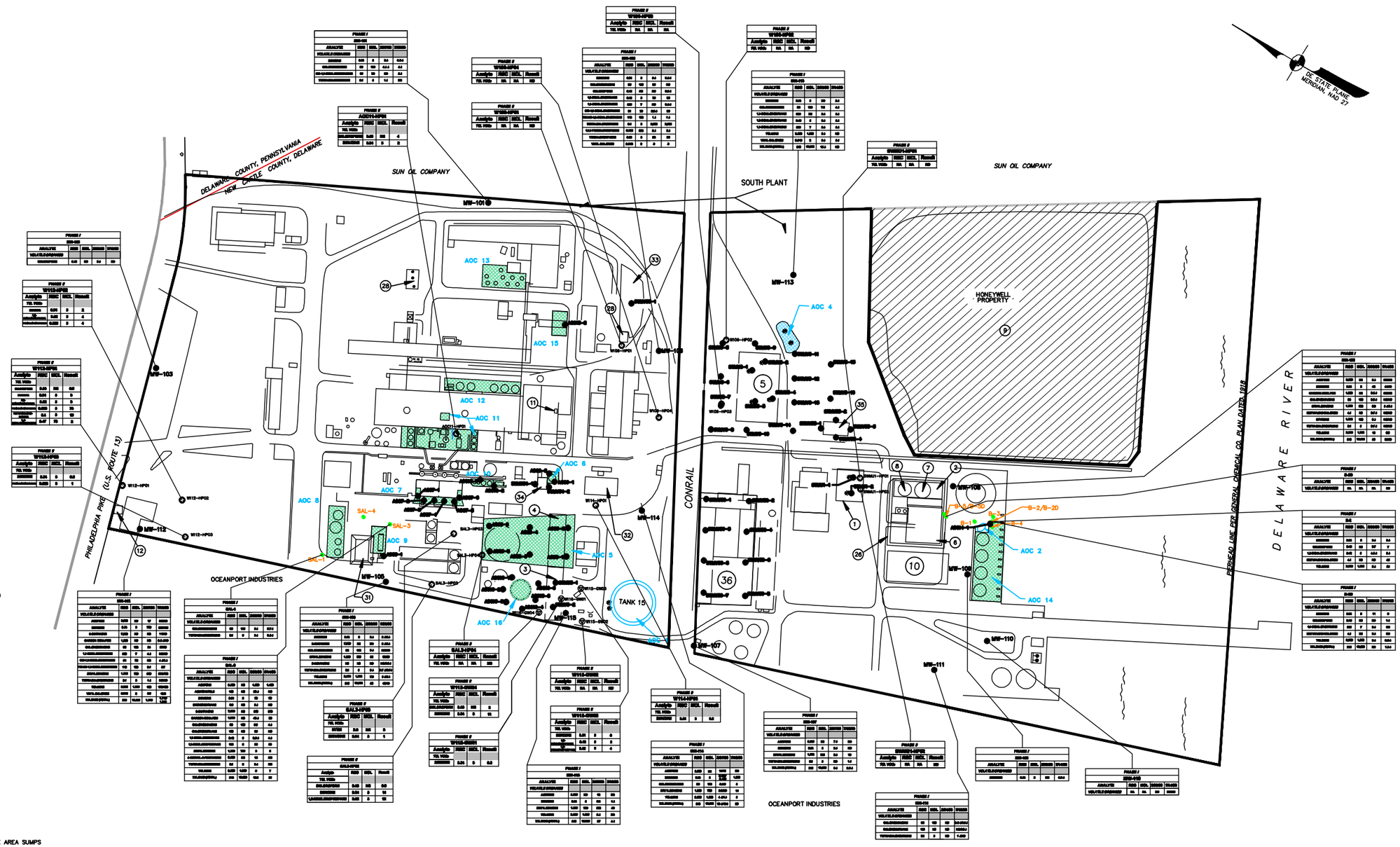
GRAPHIC SCALE
0 75 150 300 600
1 – INCH = 150 FEET



Prepared/Date: CJC 10/24/2008
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DELAWARE VALLEY WORKS - SOUTH PLANT
Claymont, Delaware

MACTEC
MACTEC Engineering and Consulting, Inc.
5205 Militia Hill Road
Plymouth Meeting, PA

PHASE I AND PHASE II GROUNDWATER SAMPLING RESULTS FOR TCL VOLATILE ORGANIC COMPOUNDS

Project 3485060089 **Figure 3-X**

LEGEND

- PIEZOMETER LOCATION — W114-HP01
- HYDROPUNCH LOCATION — W115-GW01
- EXISTING PHASE 1 WELL LOCATION — (MW-115)
- HISTORICAL GROUNDWATER MONITORING WELL LOCATION — B-3
- RFI PHASE I SOIL SAMPLING LOCATION
- APPROXIMATE RFI PHASE II SOIL SAMPLING LOCATION
- GENERAL CHEMICAL LLC PROPERTY BOUNDARY

DISSOLVED METALS reported in ug/L

SVOC's, PESTICIDES AND VOC'S reported in ug/L

NA = Not Applicable
NS = No Standard
ND = Not Detected
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ANALYTICAL QUALIFIERS

J – ANALYTE DETECTED AT AN ESTIMATED CONCENTRATION ABOVE THE LABORATORY METHOD DETECTION LIMIT BUT BELOW THE LABORATORY REPORTING LIMIT.

K – ANALYTE PRESENT. REPORTED VALUE MAY BE BIASED HIGH. ACTUAL VALUE IS EXPECTED TO BE LOWER.

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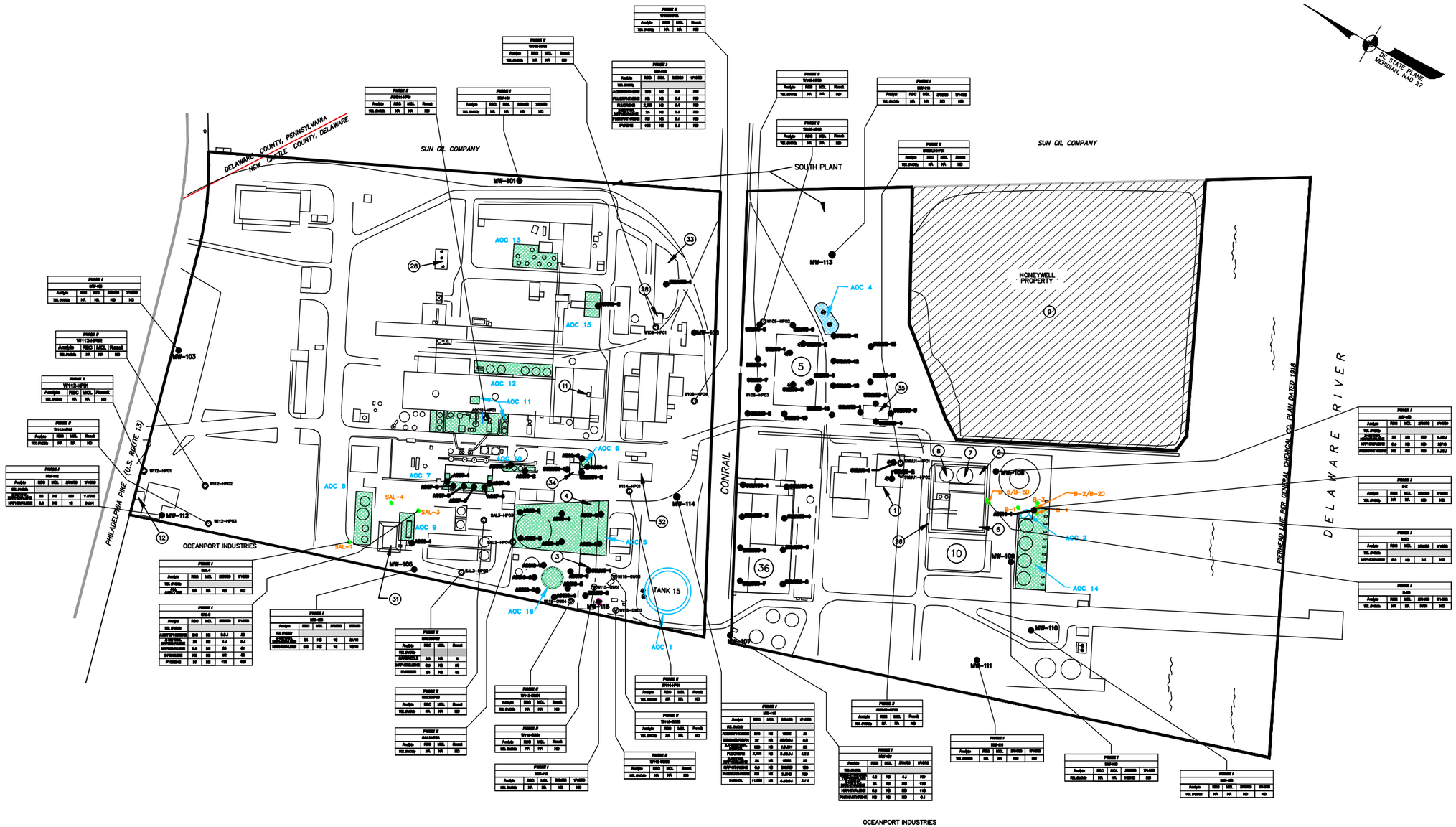

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Project 3485080308 Figure 3-X

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DE STATE PLANE MERIDIAN, NAD 27

DELAWARE COUNTY, PENNSYLVANIA / NEW CASTLE COUNTY, DELAWARE

SUN OIL COMPANY

SOUTH PLANT

HONEYWELL PROPERTY

SUN OIL COMPANY

OCEANPORT INDUSTRIES

OCEANPORT INDUSTRIES

CONRAIL

PHILADELPHIA PIKE (U.S. ROUTE 13)

PERKIOMEN LINE PER GENERAL CHEMICAL CO. PLAN DATED 1918

DELAWARE RIVER

TANK 15

MW-101 MW-102 MW-103 MW-104 MW-105 MW-106 MW-107 MW-108 MW-109 MW-110 MW-111 MW-112 MW-113 MW-114 MW-115

AOC 1 AOC 2 AOC 4 AOC 5 AOC 6 AOC 7 AOC 8 AOC 9 AOC 10 AOC 11 AOC 12 AOC 13 AOC 14 AOC 15 AOC 16

SAL-1 SAL-3 SAL-4 SAL-5 SAL-6

W112-HP01 W112-HP02 W112-HP03 W113-HP01 W113-HP02 W114-HP01 W114-HP02 W115-GW01 W115-GW02 W115-GW03 W115-GW04 W115-GW05 W115-GW06 W115-GW07 W115-GW08 W115-GW09 W115-GW10 W115-GW11 W115-GW12 W115-GW13 W115-GW14 W115-GW15 W115-GW16 W115-GW17 W115-GW18 W115-GW19 W115-GW20 W115-GW21 W115-GW22 W115-GW23 W115-GW24 W115-GW25 W115-GW26 W115-GW27 W115-GW28 W115-GW29 W115-GW30 W115-GW31 W115-GW32 W115-GW33 W115-GW34 W115-GW35 W115-GW36 W115-GW37 W115-GW38 W115-GW39 W115-GW40 W115-GW41 W115-GW42 W115-GW43 W115-GW44 W115-GW45 W115-GW46 W115-GW47 W115-GW48 W115-GW49 W115-GW50 W115-GW51 W115-GW52 W115-GW53 W115-GW54 W115-GW55 W115-GW56 W115-GW57 W115-GW58 W115-GW59 W115-GW60 W115-GW61 W115-GW62 W115-GW63 W115-GW64 W115-GW65 W115-GW66 W115-GW67 W115-GW68 W115-GW69 W115-GW70 W115-GW71 W115-GW72 W115-GW73 W115-GW74 W115-GW75 W115-GW76 W115-GW77 W115-GW78 W115-GW79 W115-GW80 W115-GW81 W115-GW82 W115-GW83 W115-GW84 W115-GW85 W115-GW86 W115-GW87 W115-GW88 W115-GW89 W115-GW90 W115-GW91 W115-GW92 W115-GW93 W115-GW94 W115-GW95 W115-GW96 W115-GW97 W115-GW98 W115-GW99 W115-GW100 W115-GW101 W115-GW102 W115-GW103 W115-GW104 W115-GW105 W115-GW106 W115-GW107 W115-GW108 W115-GW109 W115-GW110 W115-GW111 W115-GW112 W115-GW113 W115-GW114 W115-GW115 W115-GW116 W115-GW117 W115-GW118 W115-GW119 W115-GW120 W115-GW121 W115-GW122 W115-GW123 W115-GW124 W115-GW125 W115-GW126 W115-GW127 W115-GW128 W115-GW129 W115-GW130 W115-GW131 W115-GW132 W115-GW133 W115-GW134 W115-GW135 W115-GW136 W115-GW137 W115-GW138 W115-GW139 W115-GW140 W115-GW141 W115-GW142 W115-GW143 W115-GW144 W115-GW145 W115-GW146 W115-GW147 W115-GW148 W115-GW149 W115-GW150 W115-GW151 W115-GW152 W115-GW153 W115-GW154 W115-GW155 W115-GW156 W115-GW157 W115-GW158 W115-GW159 W115-GW160 W115-GW161 W115-GW162 W115-GW163 W115-GW164 W115-GW165 W115-GW166 W115-GW167 W115-GW168 W115-GW169 W115-GW170 W115-GW171 W115-GW172 W115-GW173 W115-GW174 W115-GW175 W115-GW176 W115-GW177 W115-GW178 W115-GW179 W115-GW180 W115-GW181 W115-GW182 W115-GW183 W115-GW184 W115-GW185 W115-GW186 W115-GW187 W115-GW188 W115-GW189 W115-GW190 W115-GW191 W115-GW192 W115-GW193 W115-GW194 W115-GW195 W115-GW196 W115-GW197 W115-GW198 W115-GW199 W115-GW200 W115-GW201 W115-GW202 W115-GW203 W115-GW204 W115-GW205 W115-GW206 W115-GW207 W115-GW208 W115-GW209 W115-GW210 W115-GW211 W115-GW212 W115-GW213 W115-GW214 W115-GW215 W115-GW216 W115-GW217 W115-GW218 W115-GW219 W115-GW220 W115-GW221 W115-GW222 W115-GW223 W115-GW224 W115-GW225 W115-GW226 W115-GW227 W115-GW228 W115-GW229 W115-GW230 W115-GW231 W115-GW232 W115-GW233 W115-GW234 W115-GW235 W115-GW236 W115-GW237 W115-GW238 W115-GW239 W115-GW240 W115-GW241 W115-GW242 W115-GW243 W115-GW244 W115-GW245 W115-GW246 W115-GW247 W115-GW248 W115-GW249 W115-GW250 W115-GW251 W115-GW252 W115-GW253 W115-GW254 W115-GW255 W115-GW256 W115-GW257 W115-GW258 W115-GW259 W115-GW260 W115-GW261 W115-GW262 W115-GW263 W115-GW264 W115-GW265 W115-GW266 W115-GW267 W115-GW268 W115-GW269 W115-GW270 W115-GW271 W115-GW272 W115-GW273 W115-GW274 W115-GW275 W115-GW276 W115-GW277 W115-GW278 W115-GW279 W115-GW280 W115-GW281 W115-GW282 W115-GW283 W115-GW284 W115-GW285 W115-GW286 W115-GW287 W115-GW288 W115-GW289 W115-GW290 W115-GW291 W115-GW292 W115-GW293 W115-GW294 W115-GW295 W115-GW296 W115-GW297 W115-GW298 W115-GW299 W115-GW300 W115-GW301 W115-GW302 W115-GW303 W115-GW304 W115-GW305 W115-GW306 W115-GW307 W115-GW308 W115-GW309 W115-GW310 W115-GW311 W115-GW312 W115-GW313 W115-GW314 W115-GW315 W115-GW316 W115-GW317 W115-GW318 W115-GW319 W115-GW320 W115-GW321 W115-GW322 W115-GW323 W115-GW324 W115-GW325 W115-GW326 W115-GW327 W115-GW328 W115-GW329 W115-GW330 W115-GW331 W115-GW332 W115-GW333 W115-GW334 W115-GW335 W115-GW336 W115-GW337 W115-GW338 W115-GW339 W115-GW340 W115-GW341 W115-GW342 W115-GW343 W115-GW344 W115-GW345 W115-GW346 W115-GW347 W115-GW348 W115-GW349 W115-GW350 W115-GW351 W115-GW352 W115-GW353 W115-GW354 W115-GW355 W115-GW356 W115-GW357 W115-GW358 W115-GW359 W115-GW360 W115-GW361 W115-GW362 W115-GW363 W115-GW364 W115-GW365 W115-GW366 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W115-GW458 W115-GW459 W115-GW460 W115-GW461 W115-GW462 W115-GW463 W115-GW464 W115-GW465 W115-GW466 W115-GW467 W115-GW468 W115-GW469 W115-GW470 W115-GW471 W115-GW472 W115-GW473 W115-GW474 W115-GW475 W115-GW476 W115-GW477 W115-GW478 W115-GW479 W115-GW480 W115-GW481 W115-GW482 W115-GW483 W115-GW484 W115-GW485 W115-GW486 W115-GW487 W115-GW488 W115-GW489 W115-GW490 W115-GW491 W115-GW492 W115-GW493 W115-GW494 W115-GW495 W115-GW496 W115-GW497 W115-GW498 W115-GW499 W115-GW500 W115-GW501 W115-GW502 W115-GW503 W115-GW504 W115-GW505 W115-GW506 W115-GW507 W115-GW508 W115-GW509 W115-GW510 W115-GW511 W115-GW512 W115-GW513 W115-GW514 W115-GW515 W115-GW516 W115-GW517 W115-GW518 W115-GW519 W115-GW520 W115-GW521 W115-GW522 W115-GW523 W115-GW524 W115-GW525 W115-GW526 W115-GW527 W115-GW528 W115-GW529 W115-GW530 W115-GW531 W115-GW532 W115-GW533 W115-GW534 W115-GW535 W115-GW536 W115-GW537 W115-GW538 W115-GW539 W115-GW540 W115-GW541 W115-GW542 W115-GW543 W115-GW544 W115-GW545 W115-GW546 W115-GW547 W115-GW548 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Prepared/Date: CJC 10/22/2008
Checked/Date: RCK 10/24/2008

DELAWARE VALLEY WORKS - SOUTH PLANT
Claymont, Delaware

MACTEC
MACTEC Engineering and Consulting, Inc.
5205 Militia Hill Road
Plymouth Meeting, PA

PHASE I AND PHASE II GROUNDWATER SAMPLING RESULTS FOR TAL METALS

Project 3485060089

Figure 3-X

ATTACHMENT C

CUMMINGS RITER

Table 3-X
Water Level Gauging Data
July and August, 2008
Phase II RFI Data Summary Report
Honeywell Delaware Valley Works Facility
Claymont, Delaware

Monitoring Well	Top of PVC Elevation (ft msl)	Water Level (ft bgs) 7/17/2008	Groundwater Elevation (ft above MSL) 7/17/2008	Comments 7/17/2008	Water Level (ft bgs) 8/13/2008	Groundwater Elevation (ft above MSL) 8/13/2008	Comments 8/13/2008
MW-101	18.92	6.92	12.00		NM	NM	Well Casing filled with mud to 4 feet below TOC.
MW-103	30.35	8.66	21.69		8.03	22.32	
MW-105	24.40	NM	NM	Unable to locate.	NM	NM	Unable to locate.
MW-106	9.61	6.35	3.26		5.93	3.68	
MW-107	14.17	NM	NM	Obstruction in well casing. Cannot measure.	NM	NM	Obstruction in well casing. Cannot measure.
MW-108	12.11	8.62	3.49		7.74	4.37	
MW-109	12.95	8.84	4.11		8.11	4.84	
MW-110	10.71	NM	NM	Unable to open.	6.39	4.32	
MW-111	10.88	7.82	3.06		7.33	3.55	
MW-112	27.51	6.65	20.86		6.45	21.06	
MW-113	18.55	12.42	6.13		12.17	6.38	
MW-114	12.59	7.54	5.05		6.99	5.60	
MW-115		NM	NM	Unable to access. Within closed access area.	NM	NM	Unable to access. Within closed access area.
B-1	14.13	10.17	3.96		9.30	4.83	
B-2	10.52	6.60	3.92		5.78	4.74	
B-2D	9.21	5.31	3.90		4.49	4.72	
B-3	11.74	7.8	3.94		6.95	4.79	
B-4	11.54	7.61	3.93		6.77	4.77	
B-5	14.32	10.35	3.97		12.24	2.08	
B-5D	14.80	12.64	2.16		9.38	5.42	
SAL-1	27.45	8.54	18.91		8.30	19.15	
SAL-3	18.75	6.43	12.32		6.06	12.69	
SAL-4	21.10	NM	NM	Unable to locate.	NM	NM	Unable to locate.
MW-14	16.67	12.14	4.53		12.52	4.15	
MW-15	14.04	9.05	4.99		9.38	4.66	
MW-16	11.05	9.15	1.90		9.97	1.08	
MW-17	13.57	11.98	1.59		12.29	1.28	
MW-18	14.42	14.53	-0.11		14.59	-0.17	
MW-19	16.28	12.13	4.15		12.43	3.85	

Notes:
All water level measurements collected from Top Of PVC, with the exception of Well SAL-4.
The elevation and water water level measurement for Well SAL-4 was collected from ground surface.
"NM" indicates no measurement was able to be made.
"MSL" indicates mean sea level
"ft bgs" indicates feet below ground surface.

CUMMINGS RITER

ATTACHMENT D

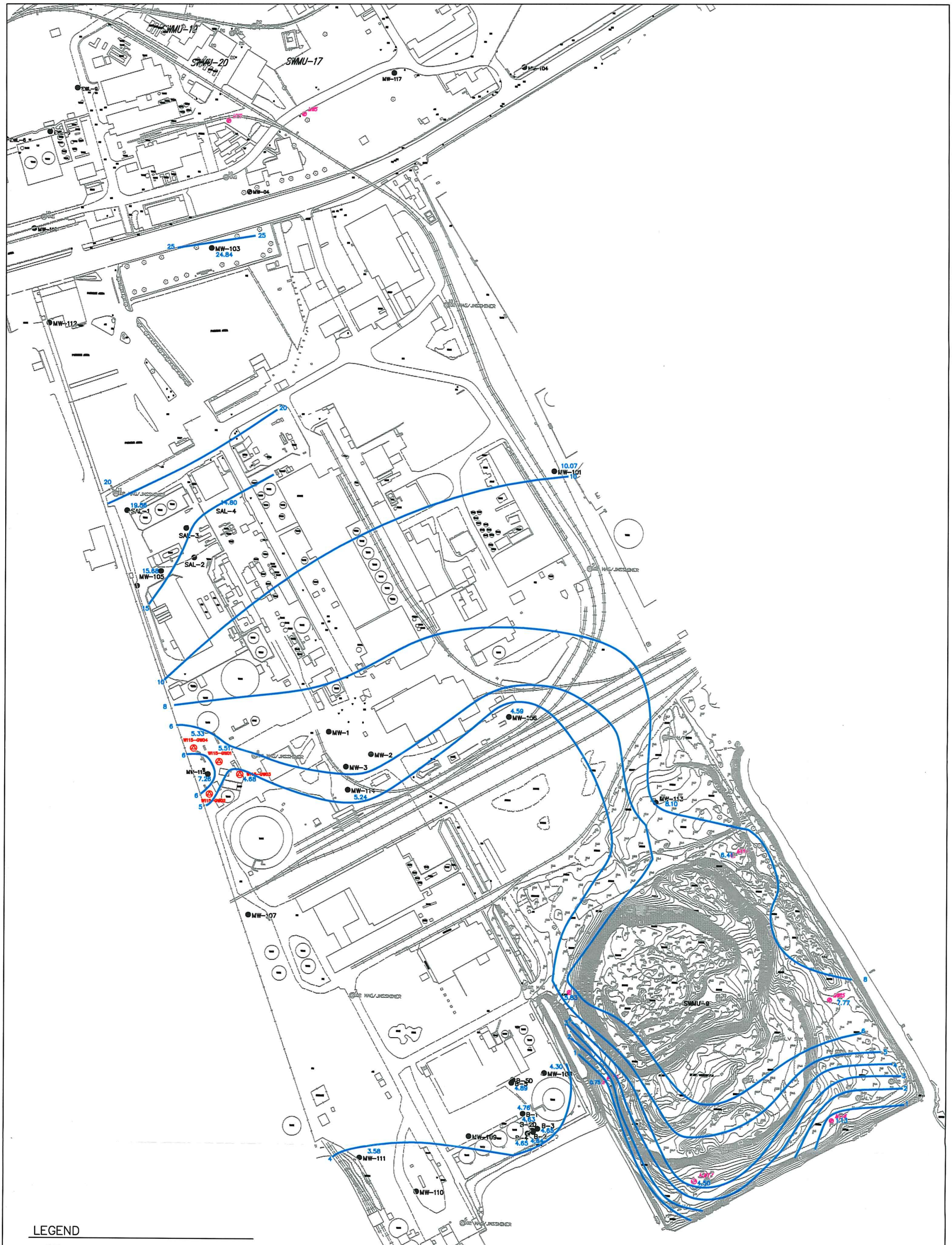
CUMMINGS RITER

DELAWARE VALLEY WORKS FACILITY
Claymont, Delaware

MACTEC
MACTEC Engineering and Consulting, Inc.
5205 Militia Hill Road
Plymouth Meeting, PA

GROUNDWATER CONTOUR MAP
JANUARY 2007

Figure 3-2



DELAWARE VALLEY
WORKS FACILITY
Route 13
Claymont, DE

MACTEC
MACTEC Engineering and Consulting, Inc.
5205 Militia Hill Road
Plymouth Meeting, PA

GROUNDWATER CONTOUR MAP
MARCH 8, 2007

Figure 3-3

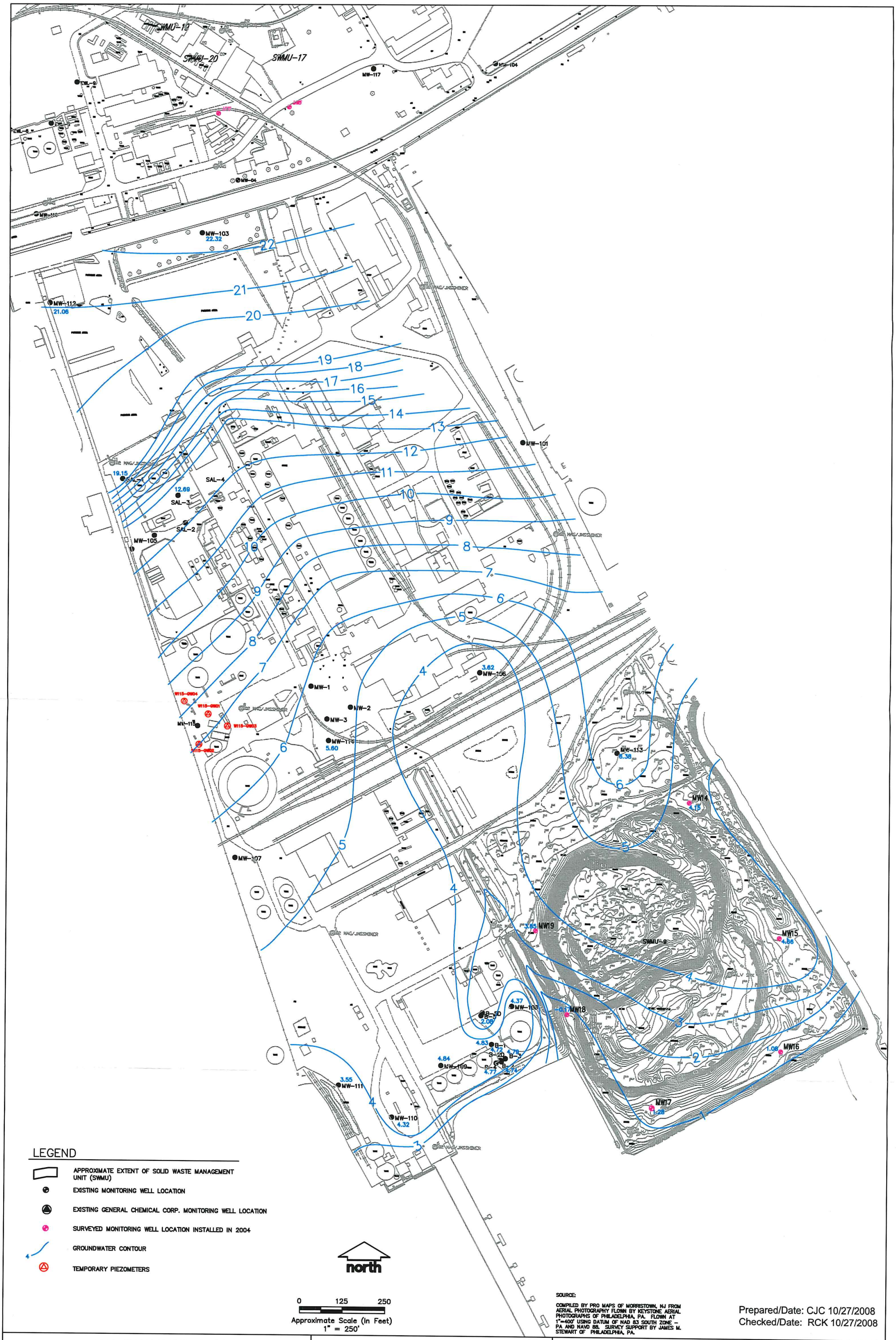
Prepared/Date: CJC 10/27/2008
Checked/Date: RCK 10/27/2008

DELAWARE VALLEY
WORKS FACILITY
Route 13
Claymont, DE

MACTEC
MACTEC Engineering and Consulting, Inc.
5205 Militia Hill Road
Plymouth Meeting, PA

GROUNDWATER CONTOUR MAP
JULY 17, 2008

Figure 3-X



DELAWARE VALLEY
WORKS FACILITY
Route 13
Claymont, DE

MACTEC
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5205 Militia Hill Road
Plymouth Meeting, PA

GROUNDWATER CONTOUR MAP
AUGUST 13, 2008

Figure 3-X

APPENDIX D: TABLE 4-1 RFI WORK PLAN (EARTH SCIENCES AND CONSULTANTS, INC.)

Table 4-1
Rationale for Soil Sampling at Solid Waste Management Units, and Areas of Concern
Delaware Valley Works Facility
Claymont, Delaware

SWMU/ AOC ID	Name	Soil Sampling and Analysis	Rationale
SWMU 1	Phosphoric Acid Storage Pond (North Pond)	Yes	Surface soils associated with the SWMU are uncovered; therefore, the soil-to-industrial worker pathway will be evaluated.
SWMU 2	Phosphoric Acid Storage Pond (South Pond)	No	SWMU is covered with concrete and asphalt; therefore, there is no exposure pathway from soil to industrial worker.
SWMU 3	Red Mud Slurry Pond A	No[(1)]	SWMU is covered with asphalt; therefore, there is no exposure pathway from soil to the industrial worker. Also, there are no documented releases.
SWMU 4	Red Mud Slurry Pond B	No	SWMU is covered with asphalt; therefore, there is no exposure pathway from soil to the industrial worker. Also, there are no documented releases.
SWMU 5	Spar Building Storage Area	No[(2)]	SWMU is thought to be covered with asphalt; therefore, there may be no exposure pathway from soil to the industrial worker. Also, there are no documented releases.
SWMU 6	Drum Storage, South Treatment Plant	No[(1)]	SWMU is covered with concrete; therefore, there is no exposure pathway from soil to the industrial worker. Also, there are no documented releases.
SWMU 7	Effluent Clarifier Tank	No	Tank has a concrete foundation and surrounding area is covered with asphalt. No documented releases.
SWMU 8	Alum Clarifier Tank	No	Tank has a concrete foundation and surrounding area covered with asphalt. No documented releases.
SWMU 10	South Waste Treatment Storage Pad	No[(2)]	SWMU is thought to be covered with concrete; therefore, there may be no exposure pathway from soil to the industrial worker. Also, there are no documented releases.
SWMU 11	Waste Oil Storage AST	No	SWMU consists of a fiberglass AST surrounded by concrete secondary containment. There are no documented releases.

Table 4-1
Rationale for Soil Sampling at Solid Waste Management Units, and Areas of Concern
Delaware Valley Works Facility
Claymont, Delaware

SWMU/ AOC ID	Name	Soil Sampling and Analysis	Rationale
SWMU 12	Waste Oil Storage UST	No	SWMU is covered with concrete; therefore, there is no exposure pathway from soil to the industrial worker. Also, there are no documented releases.
SWMU 16	Past Landfill - Area IV	Yes	Surface soils associated with the SWMU are uncovered; therefore, the soil-to-industrial worker pathway will be evaluated.
SWMU 21	Past Landfill - Area IX	Yes	Soils associated with the SWMU are partially uncovered; the soil-to-industrial worker pathway will be evaluated. Previous investigations have not defined the lateral extent of impacted soils associated with the SWMU.
SWMU 22	Past Landfill - Area X	Yes	Soils associated with the SWMU are partially uncovered; the soil-to-industrial worker pathway will be evaluated. Previous investigations have not defined the lateral extent of impacted soils associated with the SWMU.
SWMU 23	Past Landfill - Area XI	Yes	Surface soils associated with the SWMU are uncovered; therefore, the soil-to-industrial worker pathway will be evaluated.
SWMU 24	RCRA Storage Area	No	SWMU is covered with concrete; therefore, there is no exposure pathway from soil to the industrial worker. Also, there are no documented releases.
SWMU 25	Sulfuric/Oxalic Storages	No	Aboveground tanks are no longer present. The area where they were is now covered with asphalt; therefore, there is no exposure pathway for soil-to-industrial worker. Also, there are no documented releases.
SWMU 26	South Waste Treatment Plant	No	SWMU is covered with concrete and asphalt; therefore, there is no exposure pathway from soil-to-industrial worker. Also, there are no documented releases.
SWMU 27	Environmental Protection Station - North	Yes	Surface soils associated with the SWMU are uncovered; therefore, the soil-to-industrial worker pathway will be evaluated.
SWMU 28	Hypo Muds Accumulation	Yes	Surface soils associated with the SWMU are uncovered; therefore, the soil-to-industrial worker pathway will be evaluated.

Table 4-1
Rationale for Soil Sampling at Solid Waste Management Units, and Areas of Concern
Delaware Valley Works Facility
Claymont, Delaware

SWMU/ AOC ID	Name	Soil Sampling and Analysis	Rationale
SWMU 30	East and West Lagoons	Yes	Soils associated with the SWMU are partially uncovered; therefore, the soil-to-industrial worker pathway will be evaluated.
SWMU 31	Spent Acid Lagoon	No	Appropriate soil sampling and analysis activities were conducted in association with DNREC consent order.
SWMU 32	Former UST Area	No	Surface soils associated with the SWMU are covered with asphalt; therefore, there is no exposure pathway from soil to the industrial worker. Appropriate soil and groundwater sampling and analysis activities were conducted in association with closure of the USTs.
AOC 1	Tank 15 Spill Area	Yes	Surface soils associated with the SWMU are uncovered; therefore, the soil-to-industrial worker pathway will be evaluated.
AOC 2	Acid Spill Area	No	Spill area is currently covered with concrete. No pathway from soil-to-industrial worker exists.
AOC 3	Pesticide Investigation/ Remediation Area	Yes	Several areas on the north plant have soils that are uncovered; therefore, the soil-to-industrial worker pathway will be evaluated. These areas represent potential exposure pathways between soil and the industrial worker.
AOC 4	Conrail Fuel Spill Area	Yes	Surface soils associated with the SWMU are uncovered; therefore, the soil-to-industrial worker pathway will be evaluated.

Notes:

(1)If it is determined a portion of this SWMU is uncovered, it will be covered with asphalt in the immediate future.

(2)In the event the SWMUs are not found to be completely covered, soil sampling will be performed to evaluate the soil-to-industrial worker exposure pathway.

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